

**INFORMATION TO OFFERORS OR QUOTERS
SECTION A - COVER SHEET**

*Form Approved
OMB No. 9000-0002
Expires Sep 30, 2000*

The public reporting burden for this collection of information is estimated to average 35 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (9000-0002), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS. RETURN COMPLETED FORM TO THE ADDRESS IN BLOCK 4 BELOW.

1. SOLICITATION NUMBER N00178-03-R-2001	2. (X one)	3. DATE/TIME RESPONSE DUE 06 June 03, 12:00 PM
	<input type="checkbox"/> a. INVITATION FOR BID (IFB)	
	<input checked="" type="checkbox"/> b. REQUEST FOR PROPOSAL (RFP)	
	c. REQUEST FOR QUOTATION (RFQ)	

INSTRUCTIONS

NOTE: The provision entitled "Required Central Contractor Registration" is applicable to most solicitations.

1. If you are not submitting a response, complete the information in Blocks 9 through 11 and return to the issuing office in Block 4 unless a different return address is indicated in Block 7.
2. Responses must set forth full, accurate, and complete information as required by this solicitation (including attachments). "Fill-ins" are provided on Standard Form 18, Standard Form 33, and other solicitation documents. Examine the entire solicitation carefully. The penalty for making false statements is prescribed in 18 U.S.C. 1001.
3. Responses must be plainly marked with the Solicitation Number and the date and local time set forth for bid opening or receipt of proposals in the solicitation document.
4. Information regarding the timeliness of response is addressed in the provision of this solicitation entitled either "Late Submission, Modification and Withdrawal of Bid" or "Instructions to Offerors - Competitive Acquisitions".

4. ISSUING OFFICE (Complete mailing address, including ZIP Code) Contracting Officer Attn: XDS12/Bldg 183/1st Floor/ Room 104 NAVSURFWARCEN Dahlgren Division 17320 Dahlgren Road, Dahlgren, VA 22448-5100	5. ITEMS TO BE PURCHASED (Brief description) Data Transfer Systems
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6. PROCUREMENT INFORMATION (X and complete as applicable)	
<input checked="" type="checkbox"/> a. THIS PROCUREMENT IS UNRESTRICTED	
<input type="checkbox"/> b. THIS PROCUREMENT IS _____	% SET-ASIDE FOR SMALL BUSINESS. THE APPLICABLE SIC CODE IS: _____
<input type="checkbox"/> c. THIS PROCUREMENT IS _____	% SET-ASIDE FOR HUB ZONE CONCERNS. THE APPLICABLE SIC CODE IS: _____
<input type="checkbox"/> d. THIS PROCUREMENT IS RESTRICTED TO FIRMS ELIGIBLE UNDER SECTION 8(a) OF THE SMALL BUSINESS ACT.	

7. ADDITIONAL INFORMATION

8. POINT OF CONTACT FOR INFORMATION	
a. NAME (Last, First, Middle Initial) Attn: XDS12	b. ADDRESS (Include ZIP Code) Contracting Officer NAVSURFWARCEN Dahlgren Division 17320 Dahlgren Road Dahlgren VA 22448-5100
c. TELEPHONE NUMBER (Include Area Code and Extension) (540)653-7942	d. E-MAIL ADDRESS XDS12@nswc.navy.mil

9. REASONS FOR NO RESPONSE (X all that apply)	
<input type="checkbox"/> a. CANNOT COMPLY WITH SPECIFICATIONS	<input type="checkbox"/> d. DO NOT REGULARLY MANUFACTURE OR SELL THE TYPE OF ITEMS INVOLVED
<input type="checkbox"/> b. UNABLE TO IDENTIFY THE ITEM(S)	<input type="checkbox"/> e. OTHER (Specify)
<input type="checkbox"/> c. CANNOT MEET DELIVERY REQUIREMENT	

10. MAILING LIST INFORMATION (X one)	
WE <input type="checkbox"/> DO <input type="checkbox"/>	DO NOT DESIRE TO BE RETAINED ON THE MAILING LIST FOR FUTURE PROCUREMENT OF THE TYPE INVOLVED.

11a. COMPANY NAME	b. ADDRESS (Include ZIP Code)
c. ACTION OFFICER	
(1) TYPED OR PRINTED NAME (Last, First, Middle Initial)	(2) TITLE
(3) SIGNATURE	(4) DATE SIGNED (YYYYMMDD)

SOLICITATION, OFFER AND AWARD			1. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)		RATING DO-A7	PAGE OF PAGES 1 33
2. CONTRACT NUMBER		3. SOLICITATION NUMBER N00178-03-R-2001		4. TYPE OF SOLICITATION <input type="checkbox"/> SEALED BID (IFB) <input checked="" type="checkbox"/> NEGOTIATED (RFP)	5. DATE ISSUED 23 APR 03	6. REQUISITION/PURCHASE NUMBER
7. ISSUED BY Contracting Officer Naval Surface Warfare Center Dahlgren Division 17320 Dahlgren Road, Dahlgren, VA 22448-5100				8. ADDRESS OFFER TO (If other than Item 7)		

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and see Sec. L copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository located in Bldg 183, Rm 104, NSWCDD Dahlgren until 1200 local time 6 June 03
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section L, Provision No. 52.214-7 or 52.215-1. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL:	A. NAME XDS12	B. TELEPHONE (NO COLLECT CALLS) AREA CODE NUMBER EXT. 540 652-7942	C. E-MAIL ADDRESS XDS12@nswc.navy.mil
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OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52-232-8)	10 CALENDAR DAYS (%)	20 CALENDAR DAYS (%)	30 CALENDAR DAYS (%)	CALENDAR DAYS (%)
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14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated):	AMENDMENT NO.	DATE	AMENDMENT NO.	DATE

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)
15B. TELEPHONE NUMBER AREA CODE NUMBER EXT.			17. SIGNATURE
15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE. <input type="checkbox"/>			18. OFFER DATE

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION	
22. AUTHORITY FOR USING OTHER THAN FULL AND OPEN COMPETITION: <input type="checkbox"/> 10 U.S.C. 2304(c) () <input type="checkbox"/> 41 U.S.C. 253(c) ()		23. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified) ITEM	
24. ADMINISTERED BY (If other than Item 7) CODE		25. PAYMENT WILL BE MADE BY CODE	
26. NAME OF CONTRACTING OFFICER (Type or print)		27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	
		28. AWARD DATE	

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

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STANDARD FORM 33 (REV. 9-97)
Prescribed by GSA - FAR (48 CFR) 53.214(c)

SECTION B Supplies or Services and Prices

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		1.00	Lot		
0001	Data Transfer System Components				
	FFP - As detailed in Exhibit C and Exhibit R, in accordance with Section C				
				CONTRACT CEILING	\$49,254,000.00

CLAUSES INCORPORATED BY FULL TEXT**Ddl-B10 MINIMUM AND MAXIMUM QUANTITIES**

As referred to in paragraph (b) of the "Indefinite Quantity" clause in Section I of this contract, the contract minimum quantity is a total of \$100,000 worth of orders; the maximum quantity is a total of \$49,254,000. The maximum quantity is not to be exceeded.

HQ B-2-0004 EXPEDITING CONTRACT CLOSEOUT (NAVSEA) (DEC 1995)

(a) As part of the negotiated fixed price or total estimated amount of this contract, both the Government and the Contractor have agreed to waive any entitlement that otherwise might accrue to either party in any residual dollar amount of \$500 or less at the time of final contract closeout. The term "residual dollar amount" shall include all money that would otherwise be owed to either party at the end of the contract, except that, amounts connected in any way with taxation, allegations of fraud and/or antitrust violations shall be excluded. For purposes of determining residual dollar amounts, offsets of money owed by one party against money that would otherwise be paid by that party may be considered to the extent permitted by law.

(b) This agreement to waive entitlement to residual dollar amounts has been considered by both parties. It is agreed that the administrative costs for either party associated with collecting such small dollar amounts could exceed the amount to be recovered.

SECTION C Descriptions and Specifications

DESCRIPTION / SPECIFICATION

The ELINs listed in Exhibit C and Exhibit R are individual system components for the Aegis Data Transfer System. When individual ELINs are assembled into a system, the system shall meet all requirements in the Aegis Data Transfer System (DTS) Specification. The Aegis Data Transfer System (DTS) Specification is provided as Attachment J.1. The ELINs delivered shall be completely interchangeable with existing system components delivered under contracts N00178-96-C-2001 and N00178-02-D-2014. Acceptability of items delivered will be determined in accordance with the DTS Production Testing Requirements provided as Attachment J.2.

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HQ C-2-0011 COMPUTER SOFTWARE AND/OR COMPUTER DATABASE(S) DELIVERED TO AND/OR RECEIVED FROM THE GOVERNMENT (NAVSEA) (NOV 1996)

- (a) The Contractor agrees to test for viruses all computer software and/or computer databases, as defined in the clause entitled "RIGHTS IN NONCOMMERCIAL COMPUTER SOFTWARE AND NONCOMMERCIAL COMPUTER SOFTWARE DOCUMENTATION" (DFARS 252.227-7014), before delivery of that computer software or computer database in whatever media and on whatever system the software is delivered. The Contractor warrants that any such computer software and/or computer database will be free of viruses when delivered.
- (b) The Contractor agrees to test any computer software and/or computer database(s) received from the Government for viruses prior to use under this contract.
- (c) Unless otherwise agreed in writing, any license agreement governing the use of any computer software to be delivered as a result of this contract must be paid-up and perpetual, or so nearly perpetual as to allow the use of the computer software or computer data base with the equipment for which it is obtained, or any replacement equipment, for so long as such equipment is used. Otherwise the computer software or computer data base does not meet the minimum functional requirements of this contract. In the event there is any routine to disable the computer software or computer data base in the future, that date certain shall not be less than 25 years after the delivery date of the computer software or computer database.
- (d) No copy protection devices or systems shall be used in any computer software or computer database delivered under this contract to restrict or limit the Government from making copies. This does not prohibit license agreements from specifying the maximum amount of copies that can be made.
- (e) Delivery by the Contractor to the Government of certain technical data and other data is now frequently required in digital form rather than as hard copy. Such delivery may cause confusion between data rights and computer software rights. It is agreed that, to the extent that any such data is computer software by virtue of its delivery in digital form, the Government will be licensed to use that digital-form data with exactly the same rights and limitations as if the data had been delivered as hard copy.
- (f) Any limited rights legends or other allowed legends placed by a Contractor on technical data or other data delivered in digital form shall be digitally included on the same media as the digital-form data and must be associated with the corresponding digital-form technical data to which the legends apply to the extent possible. Such legends shall also be placed in human-readable form on a visible surface of the media carrying the digital-form data as delivered, to the extent possible.

HQ C-2-0059 UPDATING SPECIFICATIONS AND STANDARDS (NAVSEA) (AUG 1994)

If, during the performance of this or any other contract, the contractor believes that any contract contains outdated or different versions of any specifications or standards, the contractor may request that all of its contracts be updated to include the current version of the applicable specification or standard. Updating shall not affect the form, fit or function of any deliverable item or increase the cost/price of the item to the Government. The contractor should submit update requests to the Procuring Contracting Officer with copies to the Administrative Contracting Officer and cognizant program office representative for approval. The contractor shall perform the contract in accordance with the existing specifications and standards until notified of approval/disapproval by the Procuring Contracting Officer. Any approved alternate specifications or standards will be incorporated into the contract.

SECTION D Packaging and Marking

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Ddl-D10 PREPARATION FOR SHIPMENT (COMMERCIALY PACKAGED ITEMS)

Preservation, packaging, packing, and marking shall be in accordance with ASTM Designation D 3951-98 "Standard Practice for Commercial Packaging." The following additional markings apply:

[To be completed in individual orders under the contract.]

Ddl-D12 UNPACKING INSTRUCTIONS: COMPLEX OR DELICATE EQUIPMENT

(a) Location on Container. When practical, one set of the unpacking instructions will be placed in a heavy water-proof envelope prominently marked "UNPACKING INFORMATION" and firmly affixed to the outside of the shipping container in a protected location, preferably between the cleats on the end of the container adjacent to the identification marking. If the instructions cover a set of equipment packed in multiple containers, the instructions will be affixed to the number one container of the set. When the unpacking instructions are too voluminous to be affixed to the exterior of the container, they will be placed inside and directions for locating them will be provided in the envelope marked "UNPACKING INFORMATION."

(b) Marking Containers. When unpacking instructions are provided, shipping containers will be stenciled "CAUTION--THIS EQUIPMENT MAY BE SERIOUSLY DAMAGED UNLESS UNPACKING INSTRUCTIONS ARE CAREFULLY FOLLOWED. UNPACKING INSTRUCTIONS ARE LOCATED (state where located)." When practical, this marking will be applied adjacent to the identification marking on the side of the container.

Ddl-D13 NOTIFICATION OF SHIPMENT

When shipment is made, the contractor shall notify NSWCDD, Code N82 / E. Francis, phone (540)653-1592, prior to arrival of the shipment at NSWCDD, but no later than three (3) days after shipment. Notification shall include the following items:

- (a) Contract, order, and item number,
- (b) Date of item departure,
- (c) Quantity shipped,
- (d) Name of carrier,
- (e) Method of shipping,
- (f) Bill of lading number.

HQ D-1-0001 DATA PACKAGING LANGUAGE

All unclassified data shall be prepared for shipment in accordance with best commercial practice.

Classified reports, data, and documentation shall be prepared for shipment in accordance with National Industrial Security Program Operating Manual (NISPOM), DOD 5220.22-M dated January 1995.

SECTION E Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted as stated in individual delivery orders.

CLAUSES INCORPORATED BY REFERENCE:

52.246-2	Inspection Of Supplies--Fixed Price	AUG 1996
52.246-16	Responsibility For Supplies	APR 1984
252.246-7000	Material Inspection And Receiving Report	MAR 2003

CLAUSES INCORPORATED BY FULL TEXT

DTS PRODUCTION TESTING REQUIREMENTS

Testing to determine acceptability shall be in accordance with the DTS Production Testing Requirements provided as Attachment J.2.

HQ E-2-0006 GOVERNMENT FURNISHED MATERIAL (NAVSEA) (MAY 1995)

Government Furnished Material: When material is furnished by the Government, the contractor's procedures shall include at least the following:

- (a) Examination upon receipt, consistent with practicality, to detect damage in transit;
- (b) Inspection for completeness and proper type;
- (c) Periodic inspection and precautions to assure adequate storage conditions and to guard against damage from handling and deterioration during storage;
- (d) Functional testing, either prior to or after installation, or both, as required by contract to determine satisfactory operation;
- (e) Identification and protection from improper use or disposition; and
- (f) Verification of quantity.

Damaged Government Furnished Material: The contractor shall report to the Government representative any Government-furnished property found damaged, malfunctioning, or otherwise unsuitable for use. In event of damage or malfunction during or after installation, the contractor shall determine and record probable cause and necessity for withholding material from use.

Bailed Property: The contractor shall, as required by the terms of the Bailment Agreement, establish procedures for the adequate storage, maintenance, and inspection of bailed Government property. Records of all inspections and maintenance

performed on bailed property shall be maintained. These procedures and records shall be subject to review by the Government representative.

[As used in the foregoing, the term "material" applies to Government-furnished equipment to be installed in or furnished with the end item. The term "property" is Government equipment that is used in the fabrication or assembly of the end item, and is not delivered as part of the end item.]

SECTION F Deliveries or Performance

DELIVERY INFORMATION

Supplies/services will be delivered as stated in individual deliver orders.

CLAUSES INCORPORATED BY REFERENCE:

52.242-15	Stop-Work Order	AUG 1989
52.242-17	Government Delay Of Work	APR 1984
52.247-29	F.O.B. Origin	JUN 1988
52.247-55	F.O.B. Point For Delivery Of Government-Furnished Property	APR 1984
52.247-65	F.O.B. Origin, Prepaid Freight--Small Package Shipments	JAN 1991

CLAUSES INCORPORATED BY FULL TEXT

LIQUIDATED DAMAGES – SUPPLIES AND SERVICES

(a) If the Contractor fails to deliver the supplies or perform the services within the time specified in this contract, the Contractor shall, in place of actual damages, pay to the Government liquidated damages for each calendar day of delay beginning with the delivery date specified in the delivery order, but not more than 180 days. Since orders may be for single components or for fully operational AEGIS DTSSs, liquidated damages will be assessed as a percentage of the delivery's value. Liquidated damages shall be accrued on the basis of each calendar day of delay at a rate of : 0.05% each day for the first 30 days,

- 0.10% each day for the next 30 days (days 31 – 60),
- 0.24% each day for the next 30 days (days 61 – 90),
- 0.30% each day for the next 30 days (days 91 – 120),
- 0.45% each day for the next 30 days (days 121 – 150),
- 0.52% each day for the next 30 days (days 151 – 180).

The total amount shall not exceed 50% of the purchase price. If some, but not all, of the items on order are delivered/accepted ready for use by the delivery date, liquidated damages shall not accrue against those items. Liquidated damages will only be applicable to the items not delivered.

(b) The Contractor shall not be liable for liquidated damages when delays arise from causes beyond the control of and without the fault or negligence of the Contractor. Such causes may include, but are not restricted to, Acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restriction, strikes, freight embargoes, and unusually severe weather; but in every case the delay must be beyond the control of and without the fault or negligence of the Contractor. If the delays are caused by the default, late delivery, or other causes of non-performance of a subcontractor, and such default occurs out of causes beyond the control of both the contractor and the subcontractor and without the fault or negligence of either of them, the Contractor shall not be liable for liquidated damages for delays unless the supplies or services to be furnished by the subcontract were obtainable from other sources in sufficient time to permit the Contractor to meet the required performance schedule.

SHIPPING COSTS

CLINs/ELINs are priced on an F.O.B. Origin basis. Shipping costs will be determined on an individual order basis and will be included on individual orders as a discrete CLIN priced on a Not-To-Exceed basis.

52.211-8 TIME OF DELIVERY (JUN 1997)

(a) The Government requires delivery to be made according to the following schedule:

**REQUIRED DELIVERY SCHEDULE
OFFEROR'S PROPOSED DELIVERY SCHEDULE**

ITEM NO.	WITHIN ____ MONTHS AFTER DATE OF ORDER
Exhibit C Items	10 months from date of order
Exhibit R Items	In accordance with Section 3.7 for the Aegis Data Transfer System Specification (Attachment J.1)

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed, or otherwise furnished to the successful offeror, results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day award is dated. Therefore, the offeror should compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding (1) five calendar days for delivery of the award through the ordinary mails, or (2) one working day if the solicitation states that the contract or notice of award will be transmitted electronically. (The term "working day" excludes weekends and U.S. Federal holidays.) If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

Ddl-F20 RECEIVING HOURS OF OPERATION

All deliveries to the Receiving Officer, Dahlgren Division, Naval Surface Warfare Center, Dahlgren, VA shall be made Monday through Friday from 7:00 a.m. to 2:30 p.m., local time. Deliveries will not be accepted after 2:30 p.m. No deliveries will be made on government holidays.

Ddl-F40 CONTRACTOR NOTICE REGARDING LATE DELIVERY

In the event the contractor anticipates or encounters difficulty in complying with the contract delivery schedule or date, he/she shall immediately notify, in writing, the Contracting Officer and the cognizant Contract Administration Services Office, if assigned. The notice shall give the pertinent details; however such notice shall not be construed as a waiver by the Government of any contract delivery schedule, or of any rights or remedies provided by law or under this contract.

SECTION G Contract Administration Data

CLAUSES INCORPORATED BY FULL TEXT

252.242-7000 POSTAWARD CONFERENCE (DEC 1991)

The Contractor agrees to attend any postaward conference convened by the contracting activity or contract administration office in accordance with Federal Acquisition Regulation subpart 42.5.

Ddl-G1 PAYMENT INSTRUCTIONS FOR MULTIPLE ACCOUNTING CLASSIFICATION CITATIONS

The payment office shall ensure that each payment under this contract is made in accordance with the accounting classification reference numbers (ACRNs) shown on each individual invoice. ACRNs are cited by the contractor on each invoice in accordance with clause 5252.232-9000, 5252.232-9001, or 5252.232-9003, as appropriate.

Ddl-G10 GOVERNMENT CONTRACT ADMINISTRATION POINTS-OF-CONTACT AND RESPONSIBILITIES

Procuring Contracting Officer (PCO):

(a) Name: K. B. Hall
Address: Code XDS12
Dahlgren Division
Naval Surface Warfare Center
17320 Dahlgren Road
Dahlgren, Virginia 22448-5100
Phone: (540) 653-7942 FAX: (540) 653-4089
E-mail: HallKB@nswc.navy.mil

(b) PCO responsibilities are outlined in FAR 1.602-2. The PCO is the only person authorized to approve changes in any of the requirements of this contract or orders issued thereunder and, notwithstanding provisions contained elsewhere in this contract, the said authority remains solely the PCO's. The contractor shall not comply with any order, direction or request of Government personnel unless it is issued in writing and signed by the Contracting Officer or is pursuant to specific authority otherwise included as part of this contract. In the event the contractor effects any change at the direction of any person other than the PCO, the change will be considered to be unauthorized.

Contract Specialist:

(a) Name: Betty B. Kniceley
Address: Code XDS12C
Dahlgren Division
Naval Surface Warfare Center
17320 Dahlgren Road
Dahlgren, Virginia 22448-5100
Phone: (540) 653-7942 FAX: (540) 653-4089
E-mail: KniceleyBB@nswc.navy.mil

(b) The Contract Specialist is the representative of the Contracting Officer for all contractual matters.

Administrative Contracting Officer (ACO)

- (a) Name: [*]
Address: [*] * To be completed at time of award
Phone: [*]

(b) The Administrative Contracting Officer (ACO) of the cognizant Defense Contract Management Agency (DCMA) is designated as the authorized representative of the Contracting Officer for purposes of administering this contract in accordance with FAR 42.3. However, in view of the technical nature of the supplies and services to be furnished, technical cognizance is retained by the Naval Surface Warfare Center, Dahlgren Division.

Contracting Officer's Representative (COR):

- (a) Name: Erick Francis
Address: Code N82
Dahlgren Division
Naval Surface Warfare Center
17320 Dahlgren Road
Dahlgren, Virginia 22448-5100
Phone: (540) 653-1592 FAX: (540) 653-6893
E-mail: FrancisHF@nswc.navy.mil

(b) The COR is the PCO's appointed representative for technical matters. The COR is not a contracting officer and does not have the authority to direct the accomplishment of effort which is beyond the scope of the contract or to otherwise change any contract requirements. An informational copy of the COR appointment letter which provides a delineation of COR authority and responsibilities is provided as an attachment to this contract.

Paying Office

- (a) Name: [*]
Address: [*] * To be completed at time of award
Phone: [*]

(b) The Paying Office makes all payments under the contract.

Ddl-G20 ORDERING (INDEFINITE DELIVERY TYPE CONTRACTS)

(a) Ordering: All NSWCDD Warranted Contracting Officers are authorized ordering officers. Supplies or services to be furnished under this contract shall be furnished at such times as ordered by the issuance of Orders on DD Form 1155 by the Contracting Officer. All orders are subject to the terms and conditions of this contract. This contract shall control in the event of conflict with any order.

(b) Ordering Procedures:

(1) Orders issued shall include, but not be limited to the following information (when applicable):

- (i) Date of order.
- (ii) Contract and order number.
- (iii) Type of Order
- (iv) Appropriation and accounting data.
- (v) Description of the services to be performed.

- (vi) Description of end item(s) to be delivered.
- (vii) DD Form 254 (Contract Security Classification Specification) if different than the basic contract
- (viii) DD Form 1423 (Contract Data Requirements List), if data to be delivered under the order is not listed on the DD Form 1423 included in this contract.
- (ix) The individual responsible for inspection/acceptance.
- (x) Period of performance/delivery date.
- (xi) List of Government furnished equipment, material, and information.

(2) Oral orders may be placed only in emergency circumstances. Information described above shall be furnished to the contractor at the time of placing an oral order and shall be confirmed by issuance of a written Order on DD Form 1155 within two working days.

(c) Modifications of Orders: Orders may be modified only by the Contracting Officer and may be modified orally by the Contracting Officer in emergency circumstances. Oral modifications shall be confirmed by issuance of a written modification within two working days from the time of the oral communication modifying the order.

(d) Unilateral Orders. Delivery Orders under this contract will ordinarily be issued after both parties agree on all terms. If the parties fail to agree, the Contracting Officer may require the contractor to perform and any disagreement shall be deemed a dispute within the meaning of the "Disputes" clause.

Ddl-G30 PROGRESS PAYMENTS INVOICING

All contractor requests for progress payments shall be submitted on Standard Form 1443 "Contractor's Request for Progress Payments", in lieu of an invoice, in accordance with instructions contained on the reverse side of the Standard Form 1443. Submit forms to the Contract Administration Office for certification of progress payments; submit one copy each to the PCO and the COR. The Administering Office is listed on page 1 (Block 6 of SF 26 or Block 24 of SF 33).

NAPS 5252.232-9000 SUBMISSION OF INVOICES (FIXED PRICE) (JUL 1992)

- (a) "Invoice" as used in this clause does not include contractor requests for progress payments.
- (b) The contractor shall submit original invoices with 2 (two) copies to the address identified in the solicitation/contract award form (SF 26-Block 10; SF 33-Block 23; SF 1447-Block 14), unless delivery orders are applicable, in which case invoices will be segregated by individual order and submitted to the address specified in the order (DD 1155-Block 13 or SF 26-Block 10).
- (c) The use of copies of the Material Inspection and Receiving Report (MIRR), DD Form 250, as an invoice is encouraged. DFARS Appendix F-306 provides instructions for such use. Copies of the MIRR used as an invoice are in addition to the standard distribution stated in DFARS F-401.
- (d) In addition to the requirements of the Prompt Payment clause of this contract, the contractor shall cite on each invoice the contract line item number (CLIN); the contract subline item number (SLIN), if applicable; the accounting classification reference number (ACRN) as identified on the financial accounting data sheets, and the payment terms.
- (e) The contractor shall prepare:
 - ☐ a separate invoice for each activity designated to receive the supplies or services.
 - ☐ a consolidated invoice covering all shipments delivered under an individual order.
 - ☒ either of the above.
- (f) If acceptance is at origin, the contractor shall submit the MIRR or other acceptance verification directly to the designated payment office. If acceptance is at destination, the consignee will forward acceptance verification to the designated payment office.

SECTION H Special Contract Requirements

CLAUSES INCORPORATED BY FULL TEXT

Ddl-H10 EMPLOYMENT OF US GOVERNMENT PERSONNEL RESTRICTED

In performing this contract, the Contractor shall not use as a consultant or employ (on either a full or part time basis) any active duty U.S. Government personnel (civilian or military) without the prior written approval of the Contracting Officer. Such approval may be given only in circumstances where it is clear that no laws and no DOD or U.S. Government instructions, regulations, or policies might possibly be contravened and no appearance of a conflict of interest will result.

Ddl-H32 CONTRACTOR'S RESPONSIBILITY FOR LOSS OR DAMAGE

The contractor assumes full responsibility for and shall indemnify the Government for any and all loss or damage of whatsoever kind and nature to any and all Government property, including equipment, supplies, accessories, or parts furnished, while in his custody and care for storage, repairs, or services to be performed under the terms of this contract, resulting in whole or in part from the negligent acts or omissions of the contractor, any subcontractor, or any employee, agent, or representative of the contractor or subcontractor.

Ddl-H45 ENGINEERING CHANGES

(a) After contract award, the Government may solicit, and the Contractor is encouraged to propose independently, engineering changes to the equipment, software specifications, or other requirements of this contract. These changes may be proposed to save money, to improve performance, to incorporate new technology, to save energy, or to satisfy increased data processing requirements. If the proposed changes are acceptable to both parties, the Contractor shall submit a priced change proposal to the Government for evaluation. Those proposed engineering changes that are acceptable to the Government will be processed as modifications to the contract.

(b) This ENGINEERING CHANGES clause applies only to those proposed changes identified by the Contractor, as a proposal submitted pursuant to the provisions of this clause. As a minimum, the following information shall be submitted by the Contractor with each proposal:

(1) A description of the difference between the existing contract requirement and the proposed change, and the comparative advantages and disadvantages of each;

(2) Itemized requirements of the contract which must be changed if the proposal is adopted, and the proposed revision to the contract for each such change;

(3) An estimate of the changes in performance and cost, if any, that will result from adoption of the proposal;

(4) An evaluation of the effects the proposed change would have on collateral costs to the Government, such as Government-furnished property costs, costs of related items, and costs of maintenance and operation; and

(5) A statement of the time by which the change order adopting the proposal must be issued so as to obtain the maximum benefits of the change(s) during the remainder of this contract. Also, any effect on the contract completion time or delivery schedule shall be identified.

(c) Engineering change proposals submitted to the Contracting Officer shall be processed expeditiously. The Government shall not be liable for proposal preparation costs or any delay in acting upon any proposal submitted pursuant to this clause. The Contractor has the right to withdraw, in whole or in part, any engineering change proposal not accepted by the Government within the period specified in the engineering change proposal. The decision of the Contracting Officer as to the acceptance of any such proposal under this contract shall be final.

(d) The Contracting Officer may accept any engineering change proposal submitted pursuant to this clause by giving the Contractor written notice thereof. This written notice may be given by issuance of a modification to this contract. Unless and until a modification is executed to incorporate an engineering change proposal under this contract, the Contractor shall remain obligated to perform in accordance with the terms of the existing contract.

(e) If an engineering change proposal submitted pursuant to this clause is accepted and applied to this contract, an equitable adjustment in the contract price and in any other affected provisions of this contract shall be made in accordance with this clause and other applicable clauses of this contract. When the cost of performance of this contract is increased or decreased as a result of the change, the equitable adjustment increasing or decreasing the contract price shall be in accordance with the "CHANGES" clause rather than under this clause, but the resulting contract modification shall state that it is made pursuant to this clause.

(f) The Contractor is requested to identify specifically any information contained in the engineering change proposal which the Contractor considers confidential and/or proprietary and which the Contractor prefers not be disclosed to the public. The identification of information as confidential and/or proprietary is for informational purposes only and shall not be binding on the Government to prevent disclosure of such information. Offerors are advised that such information may be subject to release upon request pursuant to the Freedom of Information Act (5 U.S.C. 552)

Ddl-H50 NOTICE OF INCORPORATION OF SECTION K

Section K of the solicitation (Representation, Certifications and Other Statements of Offerors) will not be distributed with the contract; however, it is incorporated in and forms a part of the resultant contract as though furnished in full text therewith.

SEA 5252.245-9108 GOVERNMENT-FURNISHED PROPERTY (PERFORMANCE) (SEP 1990)

The Government will provide only that property set forth below, notwithstanding any term or condition of this contract to the contrary. Upon Contractor's written request to the cognizant Technical Program Manager, via the cognizant Contract Administration Office, the Government will furnish the following for use in the performance of this contract:

See Attachment J.3 Government Furnished Property

SECTION I Contract Clauses**CLAUSES INCORPORATED BY REFERENCE:**

52.202-1	Definitions	DEC 2001
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions On Subcontractor Sales To The Government	JUL 1995
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	JUN 1997
52.204-2	Security Requirements	AUG 1996
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.209-6	Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment	JUL 1995
52.211-5	Material Requirements	AUG 2000
52.211-15	Defense Priority And Allocation Requirements	SEP 1990
52.215-2	Audit and Records--Negotiation	JUN 1999
52.215-8	Order of Precedence--Uniform Contract Format	OCT 1997
52.215-10	Price Reduction for Defective Cost or Pricing Data	OCT 1997
52.215-12	Subcontractor Cost or Pricing Data	OCT 1997
52.215-14	Integrity of Unit Prices	OCT 1997
52.215-14 Alt I	Integrity of Unit Prices (Oct 1997) - Alternate I	OCT 1997
52.215-15	Pension Adjustments and Asset Reversions	DEC 1998
52.215-17	Waiver of Facilities Capital Cost of Money	OCT 1997
52.215-18	Reversion or Adjustment of Plans for Postretirement Benefits (PRB) Other than Pensions	OCT 1997
52.215-19	Notification of Ownership Changes	OCT 1997
52.215-21	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data--Modifications	OCT 1997
52.215-21 Alt II	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data--Modifications (Oct 1997) - Alternate II	OCT 1997
52.219-8	Utilization of Small Business Concerns	OCT 2000
52.219-9	Small Business Subcontracting Plan	JAN 2002
52.219-16	Liquidated Damages-Subcontracting Plan	JAN 1999
52.222-19	Child Labor--Cooperation with Authorities and Remedies	SEP 2002
52.222-20	Walsh-Healy Public Contracts Act	DEC 1996
52.222-21	Prohibition Of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	APR 2002
52.222-35	Equal Opportunity For Special Disabled Veterans, Veterans of the Vietnam Era and Other Eligible Veterans	DEC 2001
52.222-36	Affirmative Action For Workers With Disabilities	JUN 1998
52.222-37	Employment Reports On Special Disabled Veterans, Veterans Of The Vietnam Era, and Other Eligible Veterans	DEC 2001
52.223-6	Drug Free Workplace	MAY 2001
52.225-8	Duty-Free Entry	FEB 2000
52.225-13	Restrictions on Certain Foreign Purchases	JUL 2000
52.226-1	Utilization Of Indian Organizations And Indian-Owned Economic Enterprises	JUN 2000
52.227-1	Authorization and Consent	JUL 1995
52.227-2	Notice And Assistance Regarding Patent And Copyright Infringement	AUG 1996
52.227-3	Patent Indemnity	APR 1984

52.229-4	Federal, State And Local Taxes (Noncompetitive Contract)	JAN 1991
52.230-2	Cost Accounting Standards	APR 1998
52.230-3	Disclosure And Consistency Of Cost Accounting Practices	APR 1998
52.230-6	Administration Of Cost Accounting Standards	NOV 1999
52.232-1	Payments	APR 1984
52.232-8	Discounts For Prompt Payment	FEB 2002
52.232-9	Limitation On Withholding Of Payments	APR 1984
52.232-11	Extras	APR 1984
52.232-16	Progress Payments	FEB 2002
52.232-16 Alt I	Progress Payments (Dec 2002) - Alternate I	MAR 2000
52.232-17	Interest	JUN 1996
52.232-23	Assignment Of Claims	JAN 1986
52.232-25	Prompt Payment	FEB 2002
52.232-33	Payment by Electronic Funds Transfer--Central Contractor Registration	MAY 1999
52.233-1	Disputes	JUL 2002
52.233-3	Protest After Award	AUG 1996
52.239-1	Privacy or Security Safeguards	AUG 1996
52.242-13	Bankruptcy	JUL 1995
52.243-1	Changes--Fixed Price	AUG 1987
52.243-6	Change Order Accounting	APR 1984
52.244-5	Competition In Subcontracting	DEC 1996
52.244-6	Subcontracts for Commercial Items and Commercial Components	APR 2003
52.245-2	Government Property (Fixed Price Contracts)	DEC 1989
52.246-19 Alt I	Warranty Of Systems & Equipment Under Performance Specifications Or Design Criteria (May 2001) - Alternate I	APR 1984
52.246-24	Limitation Of Liability-High Value Items	FEB 1997
52.247-1	Commercial Bill Of Lading Notations	APR 1984
52.248-1	Value Engineering	FEB 2000
52.249-2	Termination For Convenience Of The Government (Fixed-Price)	SEP 1996
52.249-8	Default (Fixed-Price Supply & Service)	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.201-7000	Contracting Officer's Representative	DEC 1991
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	MAR 1999
252.203-7002	Display Of DOD Hotline Poster	DEC 1991
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.204-7004	Required Central Contractor Registration	NOV 2001
252.205-7000	Provisions Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7000	Acquisition From Subcontractors Subject To On-Site Inspection Under The Intermediate Range Nuclear Forces (INF) Treaty	NOV 1995
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	MAR 1998
252.211-7005	Substitutions for Military or Federal Specifications and Standards	FEB 2003
252.215-7000	Pricing Adjustments	DEC 1991
252.215-7002	Cost Estimating System Requirements	OCT 1998
252.217-7026	Identification of Sources of Supply	NOV 1995
252.219-7003	Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)	APR 1996
252.223-7004	Drug Free Work Force	SEP 1988
252.225-7001	Buy American Act And Balance Of Payments Program	MAR 1998
252.225-7002	Qualifying Country Sources As Subcontractors	DEC 1991
252.225-7026	Reporting Of Contract Performance Outside The United States	JUN 2000
252.225-7031	Secondary Arab Boycott Of Israel	JUN 1992
252.226-7001	Utilization of Indian Organizations and Indian-Owned Economic Enterprises-DOD Contracts	SEP 2001
252.227-7013	Rights in Technical Data--Noncommercial Items	NOV 1995

252.227-7014	Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation	JUN 1995
252.227-7015	Technical Data--Commercial Items	NOV 1995
252.227-7016	Rights in Bid or Proposal Information	JUN 1995
252.227-7019	Validation of Asserted Restrictions--Computer Software	JUN 1995
252.227-7027	Deferred Ordering Of Technical Data Or Computer Software	APR 1988
252.227-7036	Declaration of Technical Data Conformity	JAN 1997
252.227-7037	Validation of Restrictive Markings on Technical Data	SEP 1999
252.231-7000	Supplemental Cost Principles	DEC 1991
252.232-7004	DOD Progress Payment Rates	OCT 2001
252.242-7003	Application For U.S. Government Shipping Documentation/Instructions	DEC 1991
252.243-7001	Pricing Of Contract Modifications	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.245-7001	Reports Of Government Property	MAY 1994
252.247-7023	Transportation of Supplies by Sea	MAY 2002
252.247-7023 Alt I	Transportation of Supplies by Sea (May 2002) Alternate I	MAR 2000
252.247-7024	Notification Of Transportation Of Supplies By Sea	MAR 2000

CLAUSES INCORPORATED BY FULL TEXT

52.216-18 ORDERING. (OCT 1995)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from date of award through five years from date of award.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

52.216-19 ORDER LIMITATIONS. (OCT 1995)

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$1,000.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) Maximum order. The Contractor is not obligated to honor:

(1) Any order for a single item in excess of \$1,500,000.00;

(2) Any order for a combination of items in excess of \$2,500,000.00; or

(3) A series of orders from the same ordering office within 30 days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 2 business days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

52.216-22 INDEFINITE QUANTITY. (OCT 1995)

(a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum". The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum".

(c) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after 84 months from date of contract award.

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far>

<http://farsite.hill.af.mil/>

<http://www.abm.rda.hq.navy.mil/naps>

SECTION J List of Documents, Exhibits and Other Attachments

Ddl-J10 LIST OF ATTACHMENTS

Exhibit A – Contract Data Requirements List, DD1423, 2 pages

Exhibit C – DTS Pricing Schedule ELINs, 4 pages

Exhibit R – DTS Repair Pricing ELINs, 2 pages

Attachment J.1 – Aegis Data Transfer System (DTS) Specification 106 pages

Attachment J.2 – DTS Production Testing Requirements 17 pages

Attachment J.3 – Government Furnished Property, 2 pages

Attachment J.4 – Contract Security Classification Specification, DD254, 2 pages

Attachment J.5 – Value Engineering Guide, 3 pages

Attachment J.6 – Contracting Officer's Representative Appointment Letter (to be incorporated at time of award)

SECTION K Representations, Certifications and Other Statements of Offerors

CLAUSES INCORPORATED BY REFERENCE:

52.203-11	Certification And Disclosure Regarding Payments To Influence Certain Federal Transactions	APR 1991
52.222-38	Compliance with Veterans' Employment Reporting Requirements	DEC 2001
252.209-7001	Disclosure of Ownership or Control by the Government of a Terrorist Country	MAR 1998
252.225-7017	Prohibition on Award to Companies Owned by the People's Republic of China	FEB 2000
252.227-7028	Technical Data or Computer Software Previously Delivered to the Government	JUN 1995

CLAUSES INCORPORATED BY FULL TEXT

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that --

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to --

(i) Those prices,

(ii) The intention to submit an offer, or

(iii) The methods of factors used to calculate the prices offered:

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory --

(1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision _____ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of provision)

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

"Common parent," as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

___ TIN: _____

___ TIN has been applied for.

___ TIN is not required because:

___ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

___ Offeror is an agency or instrumentality of a foreign government;

___ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

___ Sole proprietorship;

___ Partnership;

___ Corporate entity (not tax-exempt);

___ Corporate entity (tax-exempt);

___ Government entity (Federal, State, or local);

___ Foreign government;

___ International organization per 26 CFR 1.6049-4;

___ Other _____

(f) Common parent.

___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

___ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it () is a women-owned business concern.

(End of provision)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals--

(A) Are () are not () presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have () have not (), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are () are not () presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.

(ii) The Offeror has () has not (), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.215-6 PLACE OF PERFORMANCE (OCT 1997)

(a) The offeror or respondent, in the performance of any contract resulting from this solicitation, () intends, () does not intend [check applicable block] to use one or more plants or facilities located at a different address from the address of the offeror or respondent as indicated in this proposal or response to request for information.

(b) If the offeror or respondent checks "intends" in paragraph (a) of this provision, it shall insert in the following spaces the required information:

Place of Performance(Street Address, City, State, County, Zip Code)	Name and Address of Owner and Operator of the Plant or Facility if Other Than Offeror or Respondent
--	--

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 334419.

(2) The small business size standard is 500 employees.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it () is, () is not a small business concern.

(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it () is, () is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a women-owned small business concern.

(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it () is, () is not a veteran-owned small business concern.

(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it () is, () is not a service-disabled veteran-owned small business concern.

(6) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, as part of its offer, that--

(i) It () is, () is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It () is, () is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture: _____.) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern," means a small business concern --

(1) That is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

(a) ☐ It has, ☐ has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;

(b) ☐ It has, ☐ has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

(a) ☐ It has, ☐ has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;

(b) ☐ It has, ☐ has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.222-25 AFFIRMATIVE ACTION COMPLIANCE (FEB 1984)

The offeror represents that

(a) ☐ it has developed and has on file, ☐ has not developed and does not have on file, at each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or

(b) [] has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

(End of provision)

52.227-6 ROYALTY INFORMATION (APR 1984)

(a) Cost or charges for royalties. When the response to this solicitation contains costs or charges for royalties totaling more than \$250, the following information shall be included in the response relating to each separate item of royalty or license fee:

- (1) Name and address of licensor.
- (2) Date of license agreement.
- (3) Patent numbers, patent application serial numbers, or other basis on which the royalty is payable.
- (4) Brief description, including any part or model numbers of each contract item or component on which the royalty is payable.
- (5) Percentage or dollar rate of royalty per unit.
- (6) Unit price of contract item.
- (7) Number of units.
- (8) Total dollar amount of royalties.

(b) Copies of current licenses. In addition, if specifically requested by the Contracting Officer before execution of the contract, the offeror shall furnish a copy of the current license agreement and an identification of applicable claims of specific patents.

(End of provision)

252.225-7000 BUY AMERICAN ACT--BALANCE OF PAYMENTS PROGRAM CERTIFICATE (SEP 1999)

(a) Definitions. Domestic end product, qualifying country, qualifying country end product, and qualifying country end product have the meanings given in the Buy American Act and Balance of Payments Program clause of this solicitation.

(b) Evaluation. Offers will be evaluated by giving preference to domestic end products and qualifying country end products over nonqualifying country end products.

(c) Certifications.

(1) The Offeror certifies that--

(i) Each end product, except those listed in paragraphs (c) (2) or (3) of this provision, is a domestic end product; and

(ii) Components of unknown origin are considered to have been mined, produced, or manufactured outside the United States or a qualifying country.

(2) The Offeror certifies that the following end products are qualifying country end products:

Qualifying Country End Products

Line Item Number

Country of Origin

(List only qualifying country end products.)

(3) The Offeror certifies that the following end products are nonqualifying country end products:

Nonqualifying Country End ProductsLine Item NumberCountry of Origin (If known)

(End of provision)

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term supplies is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) Representation. The Offeror represents that it:

____ (1) Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ (2) Does not anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. If the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

(End of provision)

Ddl-K20 AUTHORIZED NEGOTIATORS

The offeror shall provide the name and telephone number of personnel authorized to negotiate on behalf of the offeror:

In addition, the offeror shall provide a facsimile number and an email address to which correspondence and documents may be forwarded to the offeror, both prior to contract award and following contract award:

Facsimile: _____

Email: _____

SECTION L Instructions, Conditions and Notices to Bidders**CLAUSES INCORPORATED BY REFERENCE:**

52.204-6	Data Universal Numbering System (DUNS) Number	JUN 1999
52.211-7	Alternatives to Government-Unique Standards	NOV 1999
52.214-34	Submission Of Offers In The English Language	APR 1991
52.214-35	Submission Of Offers In U.S. Currency	APR 1991
52.215-20	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data	OCT 1997
52.215-20 Alt II	Requirements for Cost or Pricing Data or Information Other Than Cost or Pricing Data (Oct 1997) - Alternate II	OCT 1997
52.222-24	Preaward On-Site Equal Opportunity Compliance Evaluation	FEB 1999
52.232-13	Notice Of Progress Payments	APR 1984
52.252-5	Authorized Deviations In Provisions	APR 1984
252.217-7026	Identification of Sources of Supply	NOV 1995
252.227-7017	Identification and Assertion of Use, Release, or Disclosure Restrictions	JUN 1995

CLAUSES INCORPORATED BY FULL TEXT**PROPOSAL PREPARATION**

In order to maximize the efficiency and minimize the time for proposal evaluation, it is required that all offerors submit their proposals in accordance with the format and content specified. Proposals shall be submitted as three separate volumes, as follows:

	Original	Copies
Volume I Solicitation, Offer and Award (SF33)	1	1
Volume II Technical Proposal	1	3
Volume III Cost Proposal	1	3

The original shall be clearly identified as the "ORIGINAL" and bear original signatures. The copies shall be complete and clearly identified as "COPY".

VOLUME I SOLICITATION, OFFER AND AWARD (SF33)

(a) This document, which may be used as part of the contract award document, shall be fully executed and returned as a separate document from the technical and cost proposals. Special attention should be taken to accurately complete all Representation and Certification in Section K and ensure that an authorized person signs the offer in Block 17 of Page 1. This document shall not be embellished with any covers or binding.

(b) Offerors are not encouraged to take exceptions to this solicitation; however, any exceptions taken to the specification or terms and conditions of this solicitation shall be identified in a cover letter and explained in detail in the appropriate section of the technical or cost proposals.

VOLUME II TECHNICAL PROPOSAL

(a) Review the ELINs listed in Exhibit C and Exhibit R, the specification included as attachment J.1, and the testing requirements included in J.2. Provide a statement confirming the part numbers listed to be current and when assembled into a complete Data Transfer Switch will meet the specification requirements and successfully complete the required testing.

(b) Provide a detailed description of what is included in the following ELINs: (1) System Integration and Testing, (2) Installation and Checkout, and (3) Training. Provide an explanation of how the amount of time necessary for Systems Integration and Testing will be estimated and how the amount of time necessary for Installation and Checkout will be estimated. This explanation should include a sample with a typical DTS configuration. Provide a high-level outline of the training

(c) Review the Delivery Schedule specified in Section F of the solicitation and explain any deviations / proposed revisions. Also review the Order Limitations specified in Section I and provide comments.

(d) Explain your understanding of how the ordering process will operate under the resultant contract. Include an explanation of how pricing will be adjusted if the government provides GFM to be incorporated in the ordered item(s).

(e) Provide information about any system you have for determining the components necessary for a DTS to meet a specific government switching requirement.

(f) Provide written consent to utilize contractor technical advisors during proposal evaluation as specified in the provision Notice of Intent to Use Contractor Technical Advisors for Proposal Evaluation.

VOLUME III COST PROPOSAL

(a) The cost proposal shall include the name, address, Point of Contact, and telephone number of the cognizant DCAA office and DCMC office. Copies of your proposal should be forwarded to the cognizant DCAA office and cognizant DCMC office concurrent with submission to this office.

(b) The cost proposal shall be based on a contract start date of 1 August 2003. This date is only an estimate of the anticipated contract start date. A definitive contract start date will be incorporated into the contract award document.

(c) The Government estimates that a total contract ceiling of \$49,254,000 will be sufficient to cover orders over the five year contract period. Exhibits C and R defines the items that may be purchased under the contract. Pricing is requested based on a quantity of 1 of each item/lot identified. If there are minimum quantities greater than 1 for any item, please indicate the minimum quantity buy and provide rationale for the minimum buy amount. The contractor shall also identify quantity discounts available for any of the items, by identifying the quantity increment(s) and associated price(s) as discussed in FAR 52.207-4 Economic Purchase Quantity – Supplies. On Exhibits C and R, utilize the columns to the right of the 1 each unit price to enter the quantity(ies) and associated unit pricing.

(d) As detailed in the Cost Proposal-Specific Requirements-Certified Cost or Pricing Data provision, full cost and pricing data is required to support your proposed costs. This data shall be structured so that each material item is broken down to disclose the detailed type of costs required to produce the item. It is anticipate that each item may include, but not be limited to the following categories of cost:

(1) Material Cost - bill of materials, vendor data, subcontractors, recent invoices

(2) Direct Labor Costs - labor hours, labor rates

(3) Indirect Costs - Provide a summary definition of each indirect pool, the composition of the pool, and the rates proposed. Indicate how you have computed and applied your indirect costs. Show trends and budgetary data to provide a basis for evaluating the reasonableness of proposed rates. Include historically proposed, DCAA recommended, and actual (audited and unaudited) indirect rates experienced by the contractor within the past three years and the basis for any changes to these rates. Indicate if the rates are based on a Forward Pricing Rate Agreement and provide a copy of the agreement

(4) Other Direct Costs - Identify and define each item of expense and provide a breakdown of dollars proposed and the basis for the amount.

(5) Facilities Capital Cost of Money - If proposed, complete a DD Form 1861

(6) Profit

(e) If escalation is proposed (Contract Line Item prices change during the period of the contract), the proposal shall contain detailed pricing tables (summary cost breakdown) indicating cost elements and subtotals for each contract year. If escalation is proposed for material and/or direct labor, identify the escalation rate per year and the historical actual for the escalation rate over the past two years. Indicate by example and narrative how the escalation is applied.

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--

(a) From the ASSIST database via the Internet at <http://assist.daps.mil>; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DODSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2667/2179, Facsimile (215) 697-1462.

(End of provision)

52.211-14 NOTICE OF PRIORITY RATING FOR NATIONAL DEFENSE USE (SEP 1990)

Any contract awarded as a result of this solicitation will be ☐ DX rated order; ☒ DO rated order certified for national defense use under the Defense Priorities and Allocations System (DPAS) (15 CFR 700), and the Contractor will be required to follow all of the requirements of this regulation.

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a fixed price indefinite delivery-indefinite quantity contract resulting from this solicitation.

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from K. B. Hall, Code XDS12, Naval Surface Warfare Center, Dahlgren Division, 17320 Dahlgren Road, Dahlgren, VA 22448-5100.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

<http://www.arnet.gov/far/>

<http://farsite.hill.af.mil/>

<http://www.abm.rda.hq.navy.mil/naps/>

DdI-L28 NOTICE OF INTENT TO USE CONTRACTOR TECHNICAL ADVISORS FOR PROPOSAL EVALUATION

(a) The Government intends to utilize experts from the following firms as technical advisors during the technical proposal evaluation phase: Integrated Engineering Inc. and Planning Consultants, Inc. All contractors providing technical advisors will be subject to appropriate organizational conflict of interest and non-disclosure restrictions.

(b) Contractor technical advisors will act in an advisory capacity only and their involvement will be limited to the specific areas of technical expertise required. The final Government technical evaluation of offers will not be made available to or released to contractor technical advisors.

(c) Offerors shall, in their technical proposal, provide written consent to the use of the named contractor technical advisors during the technical evaluation of proposals. This consent will enable the Government to fully evaluate the merits of each technical proposal in accordance with Section M of the solicitation. Failure to provide the requisite consent will preclude a complete technical evaluation of the offeror's proposal and may render it unacceptable.

DdI-L34 COST PROPOSAL – SPECIFIC REQUIREMENTS – CERTIFIED COST OR PRICING DATA

(a) The offeror must submit cost or pricing data, as defined in FAR 15.401, in the format prescribed in FAR Table 15-2, as part of the cost proposal. Prior to award, the accuracy, currency and completeness of such data shall be certified by the offeror using the form set out in FAR 15.406-2.

(b) If the offeror claims an exemption from cost or pricing data requirements, the basis for the exemption as set forth in FAR 15.403-1(b) and (c), must be provided.

(c) Any contractor required to submit and certify cost or pricing data in accordance with (a) above shall also be required to obtain cost or pricing data from his subcontractors under the circumstances set forth in FAR 15.403-4.

(d) Cost or pricing data furnished by a subcontractor or a prospective subcontractor pursuant to FAR 15.403-4 must be submitted to the prime contractor or higher-tier-subcontractor. It is the responsibility of the prime contractor and higher-tier-subcontractor to review and evaluate the subcontract proposal and accompanying cost or pricing data and furnish the results of such review and evaluation to the Government as part of their cost or pricing data submission.

(e) If the offeror proposes facilities capital cost of money as part of his proposed costs, he shall submit a completed DD Form 1861 entitled "Contract Facilities Capital Cost of Money" and Form CASD-CMF "Facilities Capital, Cost of Money Factors Computation." Accompanying the Forms shall be documentation in support of the computations.

(f) In addition to submission of the cost proposal to the PCO, Offerors shall submit copies of their complete cost proposal as follows:

One (1) copy - Cognizant DCMA
One (1) copy - Cognizant DCAA

Ddl-L40 SUBMISSION OF QUESTIONS BY POTENTIAL OFFERORS

It is the offeror's responsibility to bring to the attention of the Contracting Officer at the earliest possible time, but prior to the closing date, any ambiguities, discrepancies, inconsistencies, or conflicts between the Statement of Work (SOW) and other solicitation documents attached hereto or incorporated by reference. All questions are requested in writing at least 2 weeks prior to the solicitation closing date.

Ddl-L42 PRE-AWARD FACILITY SECURITY CLEARANCE

(a) No award will be made to any offeror which does not possess a facility security clearance issued by the Defense Investigative Service at the required security level. The Naval Surface Warfare Center, Dahlgren Division will initiate appropriate security clearance action for any apparent successful offeror which does not already possess such clearance. The government is not obligated to delay award pending security clearance of any offeror.

(b) The security classification of this procurement is specified in the Contract Security Classification Specification, DD Form 254, attached hereto.

SECTION M Evaluation Factors for Award

CLAUSES INCORPORATED BY FULL TEXT

HQ M-2-0001 BASIS OF AWARD (NAVSEA) (SEP 1990)

ALL UNITS OF ALL ITEMS WILL BE AWARDED TO ONE OFFEROR. OFFERS, THEREFORE, MUST BE ON THE BASIS OF FURNISHING ALL UNITS OF ALL ITEMS.

(2 Data Items)

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 220 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to the above address. Send completed form to the Government Issuing Contracting Officer for the Contract/PN No. listed in Block E.

A. CONTRACT LINE ITEM NO.		B. EXHIBIT		C. CATEGORY: TDP _____ TM _____ OTHER _____			
D. SYSTEM/ITEM DATA TRANSFER SYSTEM			E. CONTRACT/PR NO. N00178-03-D-2001		F. CONTRACTOR		
1. DATA ITEM NO. A001	2. TITLE OF DATA ITEM TECHNICAL REPORT-STUDY/SERVICES			3. SUBTITLE ACCEPTANCE TEST PROCEDURE RESULTS			
4. AUTHORITY (Data Acquisition Document No.) DI-MISC-80508A			5. CONTRACT REFERENCE		8. REQUIRING OFFICE NSWCDD N82		
7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY ASREQ	12. DATE OF FIRST SUBMISSION SEE 16	14. DISTRIBUTION			
8. APP CODE		11. AS OF DATE N/A	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES		
16. REMARKS BLK 3: RESULTS INCLUDE THE FAT AND A SUMMARY OF INCO BLK 4: CONTRACTOR'S FORMAT ACCEPTABLE, WITH GOVERNMENT CONCURRENCE. BLK 12: AS NEGOTIATED BETWEEN GOVERNMENT AND CONTRACTOR, TYPICALLY WITHIN TEN (10) WORKING DAYS AFTER DELIVERY.					Final		
				Draft	Reg	Repro	
				NSWCDD:			
				N82	2	0	
				15. TOTAL			

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

1. DATA ITEM NO. A002	2. TITLE OF DATA ITEM TECHNICAL REPORT-STUDY/SERVICES		3. SUBTITLE INCO PROCEDURES		
4. AUTHORITY (Data Acquisition Document No.) DI-MISC-80508A		5. CONTRACT REFERENCE N00178-03-D-2001		6. REQUESTING OFFICE NSWCDD N82	
7. DD 250 REQ LT	9. DIST STATEMENT REQUIRED	10. FREQUENCY ASREQ	12. DATE OF FIRST SUBMISSION SEE 16		
8. APP CODE		11. AS OF DATE N/A	13. DATE OF SUBSEQUENT SUBMISSION		
16. REMARKS BLK 4: CONTRACTOR'S FORMAT ACCEPTABLE, WITH GOVERNMENT CONCURRENCE. BLK. 12: TEN (10) WORKING DAYS PRIOR TO DELIVERY.			14. DISTRIBUTION		
			a. ADDRESSEE NSWCDD: N82	b. COPIES	
				Draft	Final Reg Repro
			15. TOTAL		

17. PRICE GROUP
18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
	8/26/02	<i>Carmen L. Fortune</i>	8/26/02

CONTRACT DATA REQUIREMENTS LIST

(2 Data Items)

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 220 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. 0001		B. EXHIBIT A		C. CATEGORY: TDP _____ TM- _____ OTHER _____	
D. SYSTEM / ITEM DATA TRANSFER SYSTEM		E. CONTRACT / PR NO. N00178-03-D-2001		F. CONTRACTOR Cable & Computer Technology, Inc.	
1. DATA ITEM NO. A003	2. TITLE OF DATA ITEM STATUS OF GOVERNMENT FURNISHED EQUIPMENT			3. SUBTITLE GFE REPORT	
4. AUTHORITY (Data Acquisition Document No.) DI-MGMT-80269		5. CONTRACT REFERENCE DFARS 252.245-7001		6. REQUIRING OFFICE PROPERTY ADMINISTRATOR	
7. DD 250 REQ N	9. DIST STATEMENT REQUIRED	10. FREQUENCY ANNUALLY	12. DATE OF FIRST SUBMISSION SEE BLK 16	14. DISTRIBUTION	
8. APP CODE		11. AS OF DATE SEE BLK 16	13. DATE OF SUBSEQUENT SUBMISSION SEE BLK 16	a. ADDRESSEE	b. COPIES
16. REMARKS BLK4: REPORT TO INCLUDE GFE PROVIDED BY GOVERNMENT AND ACQUIRED BY CONTRACTOR. UTILIZE DD FORM 1662. BLKS 11 - 13: SUBMIT ANNUALLY BY 31 OCTOBER FOR GOVERNMENT PROPERTY BALANCE AS OF 30 SEPTEMBER. EXCEPTIONS APPLY ONLY FOR CONTRACT CLOSED WITH ZERO BALANCE PRIOR TO 30 SEPTEMBER, THEN CONTRACTOR SHALL SUBMIT AS OF DATE THAT BALANCE REACHES ZERO.					

1. DATA ITEM NO.		2. TITLE OF DATA ITEM		3. SUBTITLE	
4. AUTHORITY (Data Acquisition Document No.)		5. CONTRACT REFERENCE		6. REQUIRING OFFICE	
7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION	
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	a. ADDRESSEE	b. COPIES
16. REMARKS					

G. PREPARED BY		H. DATE	I. APPROVED BY		J. DATE
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17. PRICE GROUP

18. ESTIMATED
TOTAL PRICE

17. PRICE GROUP

18. ESTIMATED
TOTAL PRICE

ELIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	Quantity Price Breaks			
				Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE
Port Interface Racks w/PI Cages (less System PWAs)							
C001	Complete 64-Channel Port Interface (PI) Rack/Standard Size (without PWAs)	PIRACK-64STD	1 each				
C011	Complete 64-Channel Port Interface (PI) Rack/Narrow (23.75") Size (without PWAs)	PIRACK-64NAR	1 each				
C002	Complete 32-Channel Port Interface (PI) Rack/Standard Size (without PWAs)	PIRACK-32STD	1 each				
C012	Complete 32-Channel Port Interface (PI) Rack/Narrow (23.75") Size (without PWAs)	PIRACK-32NAR	1 each				
Hub Equipment							
C101	Complete Standard HUB Rack (without PWAs)	HUB-STD	1 each				
C111	Complete Wide (28.75") HUB Rack (without PWAs)	HUB-WID	1 each				
C121	Complete Mini-HUB (Without PWAs)	HUB-MIN	1 each				
C200	Hub Computer Server	HUB-SRVR 300400009	1 each				
Transceivers for DTS Standard Racks							
C201	Type A/B Transceiver Assembly	DTS-XCVR-A/B 300810008	1 each				
C202	Type D Transceiver Assembly	DTS-XCVR-D 300810010	1 each				
C203	Type E Transceiver Assembly	DTS-XCVR-E 300810007	1 each				
C204	Transceiver Module Blank/Filler Panel, Std Rack	DTS-XCVR-BLANK 300900002-001	1 each				
C205	IFF Transceiver	Video Signal XCVR 300810029	1 each				
Transceivers for DTS Narrow Racks							
C211	Type A, B, C/H Transceiver Assembly, Narrow	NAR-XCVR-AB/CH 300810008	1 each				
C212	Type D Transceiver Assembly, Narrow	NAR-XCVR-D 300810010	1 each				
C213	Type E Transceiver Assembly, Narrow	NAR-XCVR-E 300810007	1 each				
C214	Transceiver Module Blank/Filler Panel, Narrow Rack	NAR-XCVR-BLANK 300900002	1 each				
Port Interface PWAs for All Racks							
C301	Quad-Parallel Port Interface PWA	QUAD-PAR-PI 300810002	1 each				
C302	Quad-Serial Port Interface PWA	QUAD-SER-PI 300810001	1 each				
C303	EBM (PI Cage) & PI Blank/Filler Panel, 9Ux4HP	EBM/QUAD-PI-BLANK 01-3685-194	1 each				
C304	Quad-Parallel Port Test Fixture PWA	QUAD-PAR-TF 300810002-102	1 each				
C305	Quad-Serial Port Test Fixture PWA	QUAD-SER-TF 300810001-102	1 each				

ELIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	UNIT PRICE	Quantity Price Breaks					
					Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE
Basic Communications Boards										
Port Interface Basic Comm PWAs										
C401	Cage Router PWA	CAGE-RTR 300810006	1 each							
C402	Extender Bridge Module (Cage-to-HUB) PWA, 9U	EBM-C2H 300810005-C2H	1 each							
HUB Basic Comm PWAs										
C501	Extender Bridge Module (HUB-to-Cage) PWA, 6U	EBM-H2C 300810005-H2C	1 each							
C502	Extender Bridge Module (HUB-to-HUB) PWA, 6U	EBM-H2H 300810005-H2H	1 each							
C503	Extender Bridge (HUB) Blank/Filler Panel, 6UX4HP	EBM-BLNC 01-3685-186	1 each							
Fiber Communications Boards										
C601	Fiber Optic Transmitter (FOT) PWA	FOT 300810017	1 each							
C602	Fiber Optic Receiver (FOR) PWA	FOR 300810004	1 each							
C603	Fiber Optic Multiplexer (FOM) PWA	FOM 300810003	1 each							
C604	FOT Blank/Filler Panel	FOT-BLNC 300900041	1 each							
C605	FOR Blank/Filler Panel	FOR-BLNC 300900040	1 each							
C606	FOM/Cage Router Blank/Filler Panel, 9UX10HP	FOM-CAGERTR-BLNC 01-9802-840	1 each							
Miscellaneous										
C701	System Integration and Testing	SYS&T-DAY	per rack							
C702	Installation and Checkout	I&CO-DAY	per rack							
C703	Data Supporting All CLINs in accordance with the DD1423 provided as attachment J.4		Not Separately Priced							
C704	Shipping		Not - to - Exceed							
C750	Training - at Govt Site in accordance with SOW in conjunction with INCO (no additional travel required)		per class							
C751	Training - at Govt Site in accordance with SOW (travel required)		per class							
Spares/Common Equipment Part of Next Higher Assys										
C901	Terminal, Handheld	TERM-HH 01-0011-00	1 each							
C902	Fan Assembly, 550CFM	FAN-ASSY 03-0115-06	1 each							
C903	Blower	BLWR 03-3500-00	1 each							
C904	Fan Tray Assembly	FAN-TRAY 03-30160-FG	1 each							

ELIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	Quantity Price Breaks					
				Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE
C905	Cabinet Door Air Filter	FLTR 01-3009-FF5	1 each						
C906	AC Power Dist System/Controller	AC-PWR-DIST 03-3302-01	1 each						
C907	Rack, DC Power Supply	DC-PS-RACK 03-1658-01	1 each						
C908	Switching DC Power Supply	DC-PS-UNIT 03-1658-00	1 each						
C909	PWA, System Monitoring Card	SYS-MON-PWA 300810019	1 each						
C910	Backplane, HUB Controller	HUB-BP 300810013	1 each						
C911	Backplane, Port Interface (PI)	PI-BP 300910011	1 each						
C912	Backplane, Fiber Optic Multiplexer (FOM)	FOM-BP 300810012	1 each						
C913	Hub Computer Client	HUB-CLIENT 300400010	1 each						
C914	PWA, P1/P2 60mm Extender	P1/P2-XTNDR 300810009	1 each						
C915	PWA, P1/P2 5-Row to 3-Row Converter	5/3-ROW-CNVTR 300820009	1 each						
C916	2K Fiber Optic Extender (Suitcase, No Cards)	FO-EXTENDER 302400001	1 each						
DTS Cable Assemblies									
C920	Cable Assys, PI-XCVR Data, Channels 0-3	PI-XCVR-DCBL0/3 300700007	1 lot						
C921	Cable Assys, PI-XCVR Data, Channels 4-7	PI-XCVR-DCBL4/7 300700007	1 lot						
C922	Cable Assys, PI-XCVR Data, Channels 8-11	PI-XCVR-DCBL8/11 300700007	1 lot						
C923	Cable Assys, PI-XCVR Data, Channels 12-15	PI-XCVR-DCBL12/15 300700007	1 lot						
C924	Cable Assys, PI-XCVR Data, Channels 16-19	PI-XCVR-DCBL16/19 300700007	1 lot						
C925	Cable Assys, PI-XCVR Data, Channels 20-23	PI-XCVR-DCBL20/23 300700007	1 lot						
C926	Cable Assys, PI-XCVR Data, Channels 24-27	PI-XCVR-DCBL24/27 300700007	1 lot						
C927	Cable Assys, PI-XCVR Data, Channels 28-31	PI-XCVR-DCBL28/31 300700007	1 lot						
C928	Cable Assys, PI-XCVR Data, Channels 32-35	PI-XCVR-DCBL32/35 300700007	1 lot						
C929	Cable Assys, PI-XCVR Data, Channels 36-39	PI-XCVR-DCBL36/39 300700007	1 lot						
C930	Cable Assys, PI-XCVR Data, Channels 40-43	PI-XCVR-DCBL40/43 300700007	1 lot						
C931	Cable Assys, PI-XCVR Data, Channels 44-47	PI-XCVR-DCBL44/47 300700007	1 lot						
C932	Cable Assys, PI-XCVR Data, Channels 48-51	PI-XCVR-DCBL48/51 300700007	1 lot						
C933	Cable Assys, PI-XCVR Data, Channels 52-55	PI-XCVR-DCBL52/55 300700007	1 lot						
C934	Cable Assys, PI-XCVR Data, Channels 56-59	PI-XCVR-DCBL56/59 300700007	1 lot						

ELIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	UNIT PRICE	Quantity Price Breaks					
					Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE
C935	Cable Assys, PI-XCVR Data, Channels 60-63	PI-XCVR-DCBL60/63	1 lot							
		300700007								
C936	Cable Assys, PI-XCVR Power, Channels 0-3	PI-XCVR-PCBL0/3	1 lot							
		300700005								
C937	Cable Assys, PI-XCVR Power, Channels 4-7	PI-XCVR-PCBL4/7	1 lot							
		300700005								
C938	Cable Assys, PI-XCVR Power, Channels 8-11	PI-XCVR-PCBL8/11	1 lot							
		300700005								
C939	Cable Assys, PI-XCVR Power, Channels 12-15	PI-XCVR-PCBL12/15	1 lot							
		300700005								
C940	Cable Assys, PI-XCVR Power, Channels 16-19	PI-XCVR-PCBL16/19	1 lot							
		300700005								
C941	Cable Assys, PI-XCVR Power, Channels 20-23	PI-XCVR-PCBL20/23	1 lot							
		300700005								
C942	Cable Assys, PI-XCVR Power, Channels 24-27	PI-XCVR-PCBL24/27	1 lot							
		300700005								
C943	Cable Assys, PI-XCVR Power, Channels 28-31	PI-XCVR-PCBL28/31	1 lot							
		300700005								
C944	Cable Assys, PI-XCVR Power, Channels 32-35	PI-XCVR-PCBL32/35	1 lot							
		300700005								
C945	Cable Assys, PI-XCVR Power, Channels 36-39	PI-XCVR-PCBL36/39	1 lot							
		300700005								
C946	Cable Assys, PI-XCVR Power, Channels 40-43	PI-XCVR-PCBL40/43	1 lot							
		300700005								
C947	Cable Assys, PI-XCVR Power, Channels 44-47	PI-XCVR-PCBL44/47	1 lot							
		300700005								
C948	Cable Assys, PI-XCVR Power, Channels 48-51	PI-XCVR-PCBL48/51	1 lot							
		300700005								
C949	Cable Assys, PI-XCVR Power, Channels 52-55	PI-XCVR-PCBL52/55	1 lot							
		300700005								
C950	Cable Assys, PI-XCVR Power, Channels 56-59	PI-XCVR-PCBL56/59	1 lot							
		300700005								
C951	Cable Assys, PI-XCVR Power, Channels 60-63	PI-XCVR-PCBL60/63	1 lot							
		300700005								
C952	Gore Cable Assemblies, 2MM, Set of 12	GORE-CBLSET 01-2MMA-2073	1 lot							
C953	Cable, Power Supply Control Connector to Backplane (PI)	PS-PIBP-CBL 300700003-101	1 each							
C954	Cable, Power Supply Control Connector to Backplane (HUB)	PS-HUBBP-CBL 300700003-102	1 each							
C955	Cable, Temperature Sense to System Monitor (PI)	TEMPSNS-PISYSMON-CBL 300700004-102	1 each							
C956	Cable, Temperature Sense to System Monitor (HUB)	TEMPSNS-HUBSYSMON-CBL 300700004-101	1 each							
C957	Cable, Sys Mon to FOM (upper)	SYSMON-UPRFOM-CBL 300700006-101	1 each							
C958	Cable, Sys Mon to FOM (lower)	SYSMON-LWRFOM-CBL 300700006-102	1 each							
C959	Cable, Power Supply (TBS) to Backplane (PI)	PS-PIBP-CBL 300700008-101	1 each							
C960	Cable, Power Supply (TBS) to Backplane (HUB)	PS-HUBBP-CBL 300700008-102	1 each							
C961	Cable, System Monitor to Blower (PI)	SYSMON-PIBLWR-CBL 300700011-101	1 each							
C962	Cable, System Monitor to Blower (HUB)	SYSMON-HUBBLWR-CBL 300700011-102	1 each							

CLIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	Quantity Price Breaks			
				Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE

Repair CLINS

R200	Repair of Hub Computer Server	HUB-SRVR 300400009	1 each				
Repair of Transceivers for DTS Standard Racks							
R201	Repair of Type A/B Transceiver Assembly	DTS-XCVR-A/B 300810008	1 each				
R202	Repair of Type D Transceiver Assembly	DTS-XCVR-D 300810010	1 each				
R203	Repair of Type E Transceiver Assembly	DTS-XCVR-E 300810007	1 each				
R205	Repair of IFF Transceiver	Video Signal XCVR 300810029	1 each				
Repair of Transceivers for DTS Narrow Racks							
R211	Repair of Type A, B, C/H Transceiver Assembly, Narrow	NAR-XCVR-AB/CH 300810008	1 each				
R212	Repair of Type D Transceiver Assembly, Narrow	NAR-XCVR-D 300810010	1 each				
R213	Repair of Type E Transceiver Assembly, Narrow	NAR-XCVR-E 300810007	1 each				
Repair of Port Interface PWAs for All Racks							
R301	Repair of Quad-Parallel Port Interface PWA	QUAD-PAR-PI 300810002	1 each				
R302	Repair of Quad-Serial Port Interface PWA	QUAD-SER-PI 300810001	1 each				
R304	Repair of Quad-Parallel Port Test Fixture PWA	QUAD-PAR-TF 300810002-102	1 each				
R305	Repair of Quad-Serial Port Test Fixture PWA	QUAD-SER-TF 300810001-102	1 each				
Repair of Basic Communications Boards							
Repair of Port Interface Basic Comm PWAs							
R401	Repair of Cage Router PWA	CAGE-RTR 300810006	1 each				
R402	Repair of Extender Bridge Module (Cage-to-HUB) PWA, 9U	EBM-C2H 300810005-C2H	1 each				
Repair of HUB Basic Comm PWAs							
R501	Repair of Extender Bridge Module (HUB-to-Cage) PWA, 6U	EBM-H2C 300810005-H2C	1 each				
R502	Repair of Extender Bridge Module (HUB-to-HUB) PWA, 6U	EBM-H2H 300810005-H2H	1 each				
Repair of Fiber Communications Boards							
R601	Repair of Fiber Optic Transmitter (FOT) PWA	FOT 300810017	1 each				
R602	Repair of Fiber Optic Receiver (FOR) PWA	FOR 300810004	1 each				
R603	Repair of Fiber Optic Multiplexer (FOM) PWA	FOM 300810003	1 each				

CLIN	DESCRIPTION/UNIT	CCT MODEL/PART/DWG NO	UNIT	Quantity Price Breaks					
				Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE	Quantity Range	UNIT PRICE
Repair of Spares/Common Equipment Part of Next Higher Assys.									
R902	Repair of Fan Tray Assembly	FAN-TRAY 03-30160-FG	1 each						
R903	Repair of Blower	BLWR 03-3500-00	1 each						
R906	Repair of AC Power Dist System/Controller	AC-PWR-DIST 03-3302-01	1 each						
R907	Repair of Rack, DC Power Supply	DC-PS-RACK 03-1658-01	1 each						
R908	Repair of Switching DC Power Supply	DC-PS-UNIT 03-1658-00	1 each						
R909	Repair of PWA, System Monitoring Card	SYS-MON-PWA 300810019	1 each						
R910	Repair of Backplane, HUB Controller	HUB-BP 300810013	1 each						
R911	Repair of Backplane, Port Interface (PI)	PI-BP 300910011	1 each						
R912	Repair of Backplane, Fiber Optic Multiplexer (FOM)	FOM-BP 300810012	1 each						
R913	Repair of Hub Computer Client	HUB-CLIENT 300400010	1 each						

AEGIS

Data Transfer System (DTS)

Specification

Solicitation
N00178-03-R-2001

Naval Surface Warfare Center Dahlgren Division
Facilities Engineering Branch (N82)
17320 Dahlgren Road
Dahlgren, VA 22448-5100

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Appendices

- A. Glossary
- B. Data Transfer System Interface Design Specification

1. Introduction

1.1 Scope

This document specifies the Government's required design and performance characteristics for the Aegis Data Transfer System (DTS) previously developed under contract N00178-96-C-2001, hereinafter referred to as the System. Particular configurations and components for systems shall be as specified in individual orders under the contract.

1.2 Overview

As specified herein, the System shall simultaneously switch multiple, dissimilar Naval Tactical Data System (NTDS) serial and parallel signal types and digital video as specified in 3.2.1. The System shall be modular, expandable to over 2000 ports, and non-blocking. The System shall transmit NTDS signals over distances up to 300 meters between components while remaining transparent to the sending and receiving equipment.

1.3 Environment

The System is intended for use in land-based Naval combat system support sites and, within a ruggedized enclosure, aboard ships requiring data switching resources. The System shall be capable of being directly controlled by software-driven controllers such as the Sites Master Switch Controller (SMSC) or the Aegis Operational Readiness and Test System (ORTS), using the command set specified in Appendix B, the DTS Interface Design Specification, as specified in contract statement of work and associated documentation. Figure 1 shows a functional block diagram of the DTS.

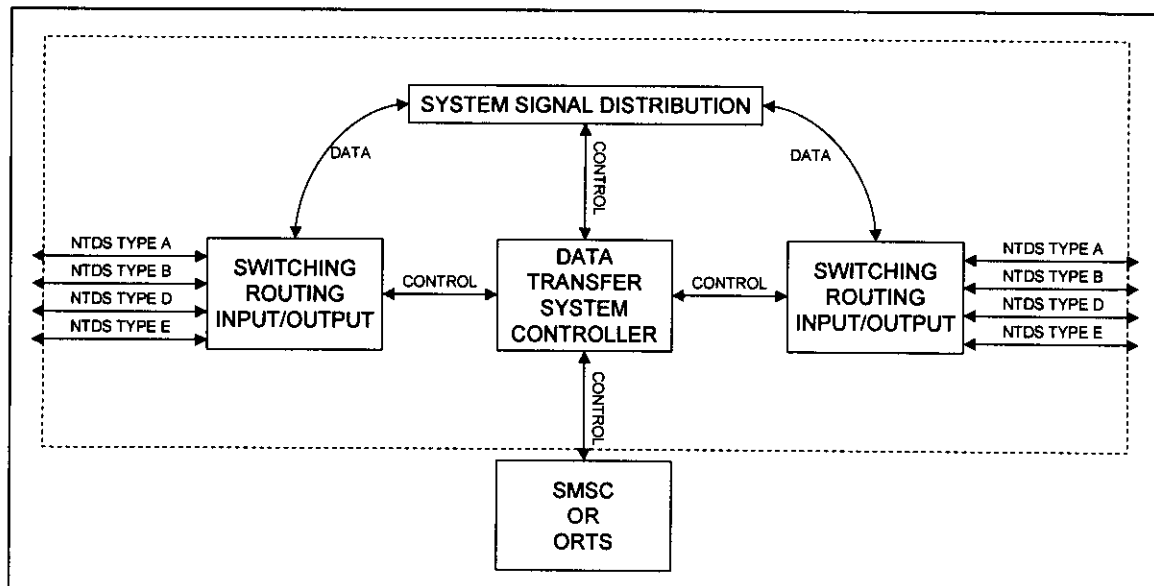


Figure 1 : Data Transfer System

2. Applicable Documents

- 2.1 MIL-STD-1397C (NAVY), Input/Output Interfaces, Standard Digital Data, Navy Systems, Notice 1, dated 22 April 1998.
- 2.2 American National Standards Institute (ANSI) Z535.1, Safety Color Code, dated 1998.
- 2.3 American National Standards Institute (ANSI) Z535.2, Environmental and Facility Safety Signs, dated June 3, 1998.
- 2.4 ANSI Z535.4, Product Safety Signs and Labels, dated 1998.
- 2.5 ANSI C62.41/ Institute of Electrical and Electronics Engineers (IEEE) 587, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits, dated 1991.
- 2.6 Code of Federal Regulations (CFR) Title 21, Chapter 1, Part 1040, Performance Standards for Light-emitting Products.
- 2.7 CFR, Title 10, Chapter 1, Part 20, Radioactive Warning Labels.
- 2.8 CFR, Title 10, Chapter 1, Part 20, Protection Against Radiation.
- 2.9 International Electrotechnical Commission (IEC) 950, Safety of Information Technology Equipment, dated April 1999.
- 2.10 Underwriters Laboratories, Inc. (UL) 1950, UL Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment, dated 28 July 1995.

Requests for ANSI and IEC documents should be addressed to the American National Standards Institute, 11 West 42 Street, New York, NY 10036, or <http://webstore.ansi.org>.

Requests for UL documents should be addressed to Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, 1-800-854-7179, or <http://global.ihs.com>.

Requests for IEEE documents should be addressed to the Institute of Electrical and Electronics Engineers Inc., 445 Hoes Lane, P. O. Box 1331, Piscataway, NJ 08855-1331, or <http://shop.ieee.org/store>.

The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 1520-7954, or <http://bookstore.gpo.gov>.

3. Requirements

3.1 General Requirements

The manufacturer shall provide a non-developmental System capable of transferring signal types identified in paragraph 3.2.1 between equipment while remaining transparent to the equipment and the System users. The System shall be modular to facilitate maintenance, expansion, and on-line replacement of Lowest Replaceable Units (LRU). The System shall allow for future technologies to be efficiently incorporated into the design at a later date. The System shall have the capability to transfer data from one input port to a configured number of System output ports simultaneously (i.e., broadcast) for NTDS signal types A and B as defined below. The system shall also have listen capability for NTDS signal types A, B, C, D, E, and H. As used in this document, the relationship between paths, ports, and channels is depicted in Figure 2. Port connectivity of the System shall be controlled through an interface between the Sites Master Switch Controller (SMSC) or the Aegis Operational Readiness and Test System (ORTS) and the Data Transfer System controller. The System shall provide capability for local maintenance actions and local control at each equipment rack, allowing for fault identification, isolation, and correction. The System shall not use atmospheric transmission of radio frequencies.

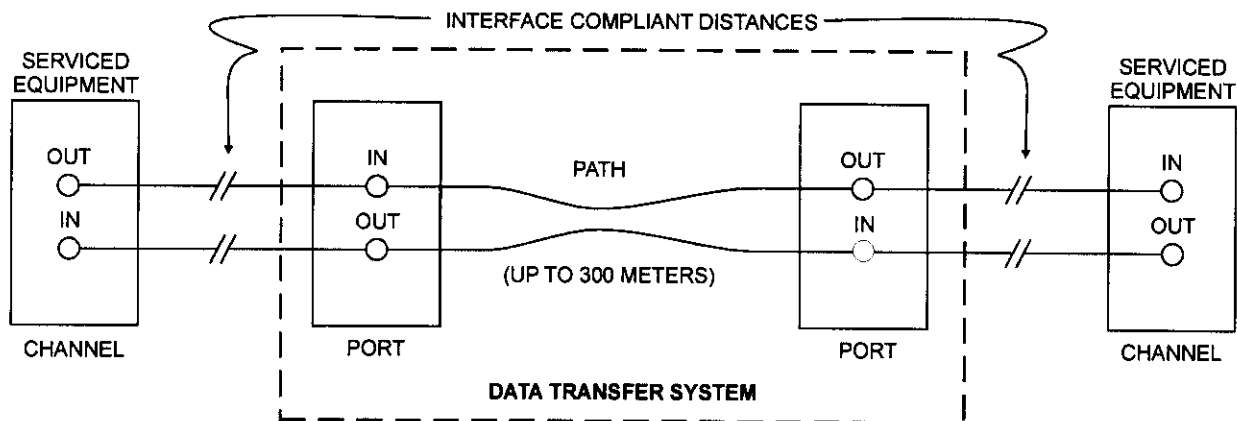


Figure 2: The Relationship between Paths, Ports, and Channels

3.2 System Top Level Requirements

3.2.1 Primary Interfaces - The System, at a minimum, shall be capable of handling MIL-STD-1397C Interface Signal Specifications: Type A - NTDS Parallel (Slow), Type B- NTDS Parallel (Fast), Type C- ANEWS, Type D - NTDS High Level Serial, Type E - NTDS NATO (Low Level Serial), Type H – High Throughput Parallel, and digital video.

3.2.2 Additional Interfaces - The System must permit additional interface types to be efficiently incorporated with minimal development effort.

3.2.3 Modular System Design - The System shall incorporate standardized units, interfaces, and dimensions for flexible use. The System shall be expandable to a maximum of 2000 ports in increments.

3.2.4 Distributed Design - The System shall be capable of servicing multiple locations within a facility. Each location in a facility may include multiple pieces of equipment. All locations shall be inter-connected to allow interfacing of all serviced equipment.

3.2.5 Distances - The System shall have the capability to allow for the transfer of signals between System ports over distances up to and including 300 meters (see Figure 2.). All signals from System ports shall be interface-compliant.

3.2.6 Hardware Interchangeability - Each delivered System shall have common hardware to permit a common sparing pool. Additionally, all components delivered under this contract shall be fully interchangeable with components delivered under previous contracts.

3.2.7 Controller Compatible - The System shall be compatible with and be capable of direct control by the Site Master Switch Controller at each of the Aegis land-based sites or the Aegis Operational Readiness and Test System (ORTS) aboard ships. See paragraph 3.3.9 (Control Interface Requirements).

3.2.8 Reliability/Maintainability - The System shall meet the Mean Time Between Failures (MTBF) and minimize Mean Time To Repair (MTTR) criteria set forth in paragraph 3.3.8.

3.2.9 Recovery Time - The System shall recover from a power failure with minimal down time and limited operator intervention. The maximum recovery time shall be less than 5 minutes. The System shall reconfigure after a power failure to the last stored configuration.

3.2.10 Positive Control - The System shall require positive action from one central control point to restore AC power after a power failure.

3.2.11 Built-In Test(s) (BIT) - The System shall have built-in tests that automatically and periodically check the System status and report any faults to the SMSC and System operator while the System is online.

3.2.12 Switch/Path Verification - Switch verification shall be conducted by the System upon software command. (Switch verification is defined as determining that the required electrical data transfer route is functional up to, but not including, System input/output (I/O) conversion between a selected data source and data destination prior to actual usage.)

3.2.13 Non-Blocking - The System shall be fully non-blocking.

3.2.14 Interface Fidelity - Any specification-compliant interface input shall be transferred as a specification-compliant output by the System without correction of correct word message errors.

3.2.15 Interface Extender Modules - The System shall include Fiber Optic (F/O) extender modules that allow the transmission of MIL-STD-1397C Type A, B, D, and E interfaces over distances up to 2 km.

3.3 Specific System Design Requirements

3.3.1 Functional Characteristics

3.3.1.1 Interface Electrical Performance Characteristics - The System shall accept inputs and provide outputs in accordance with MIL-STD-1397C. I/O connectors shall comply with MIL-STD-1397C or as specified in a delivery order. All data I/O functions, categories, and transfers shall be accommodated in accordance with the appropriate interface type. The System may convert MIL-STD-1397C signals as necessary but shall maintain message integrity and structure of signals, that is it shall not alter the pattern or word structure of any message, and shall route the unadulterated message(s) to the desired I/O port.

3.3.1.2 Isolation Parameters - In addition to the electrical specifications of MIL-STD-1397C, the System shall maintain, at all points within itself, a path crosstalk/isolation level necessary to maintain a Path Bit Error Rate (PBER) of 10^{-9} or better throughout the System.

3.3.1.3 Quantity of Ports - The System shall be readily expandable up to 2000 full duplex paths in various quantities and combinations of the interface types listed in paragraph 3.2.1.

3.3.1.4 Primary Power - The System cabinets shall be capable of non-degraded performance with the primary power of 115 VAC \pm 10%, 60 Hz, single phase. Equipment shall operate through momentary power interruptions of 150 milliseconds or less. Equipment shall tolerate voltage transients in accordance with ANSI C62.41/IEEE 587.

3.3.1.5 Interface Extender Modules - Interface extender modules shall convert specification-compliant electrical interfaces to a full duplex F/O path for transmission up to 2 km. The signal shall be received and converted back to NTDS data. Interface extender modules shall be available as stand-alone boxes and as circuit cards compatible with the System equipments.

3.3.2 Physical Characteristics - The minimum numbers of ports available in a fully populated rack shall be 64. Any port(s) of the system shall be field-configurable to any of the required signal types, including the interface connector, in a modular fashion without requiring the use of special purpose tools.

3.3.3 System Configurations - Particular configurations and component parts for systems shall be as specified in delivery order statements of work and associated documentation.

3.3.3.1 Contract CLINs - The CLINs listed in Section B are individual components (LRUs) of the system described in this document (AEGIS Data Transfer System (DTS) Specification). All CLINs are completely interchangeable with existing system components delivered under contract N00178-96-C-2001.

3.3.4 Safety

3.3.4.1 Design Requirements - The System shall be designed to perform in a safe manner in all modes of operation with minimized hazards. System design shall preclude hazards from electrical charge, heat, moving parts, and electromagnetic radiation. If identified hazards cannot be eliminated, the risk must be reduced to an acceptable level through the use of fixed, automatic protective safety features or devices. No risk reduction method shall be acceptable which leaves hazards that may cause death or severe injury to personnel, system loss, severe environmental damage, severe occupational illness, or major system damage. Equipment shall not expose personnel to hazardous voltages during installation, operation, maintenance, or repair of equipment. Hazardous voltages are defined in excess of 30VRMS or 60VDC.

3.3.4.2 Equipment Grounding - The grounding and bonding scheme of System equipments shall minimize the effects of Electromagnetic Interference (EMI) and eliminate the hazards of electrical shock. All internal System components shall employ a single point bonding scheme, which is referenced to the enclosure. A bondstrap attachment point shall be made available on all System equipment housing. All external metal surfaces of System equipment shall be electrically continuous and referenced to the bond strap attachment point in order to eliminate electrical fault shock hazards. The DC resistance from any external metal part of the System to the bondstrap attachment point shall not exceed 100 milliOhms. Additionally, the mounting surface of System equipment shall be electrically suitable for direct bond applications.

3.3.4.3 Equipment Safety Markings - Danger and caution signs, labels, and markings shall be used to warn of specific hazards such as voltage, current, thermal, or physical hazards. The signs, labels, and markings shall be as permanent as the normal life expectancy of the equipment on which they are affixed. Guards, barriers, access doors, covers, or plates shall be marked to indicate the hazard which may be reached upon removal of such devices. When possible, marking shall be located such that it is not removed when the barrier or access door is removed. Additionally, hazards internal to a unit shall be marked adjacent to hazards if they are significantly different from those of surrounding items. Such a case would be a high voltage terminal in a group of low voltage devices.

3.3.4.3.1 Color Codes - Physical hazards shall be marked with safety color codes in accordance with ANSI Z535.1 where applicable to electronic equipment.

3.3.4.3.2 Voltage Labels, Less than 500V - For potentials between 70 and 500 Volts, warning signs or labels shall be in accordance with ANSI Z535.2, Class II, and ANSI Z535.4, and shall read, as a minimum, "Caution -(Insert maximum voltage applicable) Volts."

3.3.4.3.3 Voltage Labels, Greater Than or Equal to 500V - For potentials in excess of 500 Volts, warning signs or labels shall be in accordance with ANSI Z535.2, Class I, and ANSI Z535.4, and shall read, as a minimum, "Danger - High Voltage - (Insert maximum voltage applicable) Volts."

3.3.4.3.4 Laser Warning Labels - Laser labels shall be in accordance with CFR, Title 21, Chapter 1, Part 1040.

3.3.4.3.5 Radiation Shields - Shields that protect personnel from X-band radiation shall be labeled in accordance with CFR, Title 10, Chapter 1, Part 20.

3.3.4.3.6 Prevention Tags - Coding for accident prevention tags shall be in accordance with ANSI Z535.2.

3.3.4.4 Hardware Safety - The System equipment shall include fail-safe features which allows the unit or equipment to fail only into a non-hazardous mode.

3.3.4.5 Material Safety - The System equipment shall be constructed in accordance with all applicable federal regulations. Equipment shall be designed so that Systems (including personnel, equipment, interfaces, mission, etc.) will not be exposed to safety hazards during the installation, operation, maintenance, repair, or replacement of equipment or parts thereof. Equipment shall be such that Systems will not be exposed to safety hazards should the equipment fail during the installation, operation, maintenance, repair, or replacement of the equipment or parts thereof. Equipment shall be tested in accordance with IEC 950, UL 1950, or equivalent test procedure.

3.3.5 Accessibility For Maintenance/Repair - The System equipment shall provide for optimum accessibility compatible with operation, maintenance, electromagnetic compatibility, and enclosure requirements. Each article of equipment and each major subassembly forming a part thereof shall provide for the necessary access to its interior parts, terminals, and wiring for adjustments, required circuit checking, and the removal and replacement of maintenance parts. Accessibility for testing and replacement does not apply to parts located in non-repairable subassemblies or assemblies. For routine servicing and maintenance, unsoldering of wires, wire harnesses, parts or subassemblies shall not be required in order to gain access to terminals, soldered connections, mounting screws, and any serviceable area of the equipment.

3.3.6 EMI Control - The System shall be constructed to control conducted and radiated EMI. Access panels, feedthroughs, air vents, connectors, etc., shall include provisions for EMI sealing. Power cable I/O filtering shall provide at least 60 dB of filtering above 140 kHz. The System shall operate compatibly with all co-installed equipment in the intended environment (described in paragraph 1.3).

3.3.6.1 Emissions - The System shall operate compatibly with all co-installed equipment in the intended environment (described in paragraph 1.3). Conducted emissions on power leads shall not exceed 65 dB microVolts (mean) from 10 kHz to 30 MHz.

3.3.6.2 Susceptibility - The System and its interface cables shall demonstrate no performance degradation when subjected to radiated field levels of 10 Volts per meter in the frequency range of 2 MHz to 5 GHz. The System shall have adequate line filtering to demonstrate no performance degradation when subjected to line currents of 75 microAmps in the frequency range from 10 kHz to 400 MHz.

3.3.7 Environmental Conditions

3.3.7.1 Cooling - The heat removal method shall effectively remove the heat generated within the heat generating circuitry. Forced air cooling shall be used only when natural cooling is not adequate. Exhaust and recirculating fans and blowers shall be driven by AC brushless motors or by properly shielded DC motors. The fans and blowers shall be marked to show the direction of rotation. Air filters shall be provided for air intakes for fan and blower cooled units when required to protect internal parts. Filters, if used, shall be removable for cleaning without disassembly of the equipment. All ventilation openings shall be located to comply with electromagnetic interference, undesired radiation, and enclosure requirements. Air exhaust shall be directed away from operating personnel. The System shall not employ liquid, evaporative, change of phase material, or heat pipes. Equipment containing heat critical parts that may be damaged by excessive heat when a chassis is withdrawn for maintenance shall be provided with an integral cooling system to preclude such damage.

3.3.7.2 Temperature

3.3.7.2.1 Storage - The System equipment shall not be damaged nor shall the operational performance be degraded after being exposed for 48 hours in the non-operating state to temperature extremes of 0°C to +50°C.

3.3.7.2.2 Operational - The System equipment shall be capable of continuous reliable operation under temperature extremes of +10°C to +40°C. Overtemperature sensors shall be included in all System components to automatically report overtemperature conditions.

3.3.7.3 Humidity - The System equipment shall maintain the specified performance, for both continuous, intermittent, and storage periods, at relative humidities up to 95%, non-condensing.

3.3.7.4 Acoustic Noise

3.3.7.4.1 Acoustic Noise Environment - The System equipment shall operate without degradation when subjected to airborne noise of 95 dB sound pressure over a frequency range of 125 to 8000 Hz.

3.3.7.4.2 Acoustic Noise Generation - Each cabinet, in the standby or operating configuration with the door closed and latched, at normal ambient temperature (20-30 °C), shall produce minimum acoustic noise intensity so that intelligible speech communication is possible. Free field airborne noise Speech Interference Levels (SIL), measured in dB referenced to 0.0002 dyne per square centimeter, for each cabinet of equipment, shall be below 65 dB SIL when measured at a distance of three feet from the front door, at a height two feet above the cabinet horizontal centerline.

3.3.7.5 Shock and Vibration - The tolerance to shock and vibration shall be sufficient to allow normal shipment and installation without damage.

3.3.7.6 Altitude - The System shall be capable of being transported in a non-operating state by commercial aircraft without degradation when re-energized.

3.3.8 Reliability/Maintainability

3.3.8.1 Redundancy - The System shall include redundancy to minimize the effects of an individual failure. The System shall include functionally redundant backups to assemblies with a low reliability or high criticality. Each switch cabinet shall be capable of maintaining its set configuration for an indefinite period of time after loss of the control interface, including the uninterrupted passage of data between cabinets. The failure of one System component shall not affect the operation of other System components, other than the logging of fault conditions relating to the failed equipment. The System shall include redundant power supplies, redundant data storage, and redundant controllers.

3.3.8.2 Replacement Without Adjustment - All modules or assemblies having the same part number, that are designed for removal or replacement as the normal corrective action, shall be completely interchangeable with one another and between locations of use, without adjustment of either the inserted module or parent equipment.

3.3.8.3 Replacement of Circuit Cards - All circuit cards accessible from the exterior of the System equipment shall be replaceable with the equipment powered on and operating. The replacement of one circuit card shall not adversely affect the operation of any other circuit cards within the System equipment.

3.3.8.4 Preventive Maintenance - The System shall not require preventive maintenance beyond the routine changing of filters.

3.3.8.5 Fault Detection - The System shall use built-in test (BIT) and diagnostics to automatically resolve and log failures down to the System cabinet level and to the LRU level. The System shall include Built In Test Equipment (BITE) and shall automatically resolve and log failures down to the equipment level 99% of the time. The BITE shall automatically log failures down to the LRU level 98% of the time. After fault detection, amplifying data such as error messages shall be provided to the SMSC. These messages shall indicate the tests conducted and the failures incurred. The System shall report all failures to the controlling SMSC or ORTS.

3.3.8.5.1 Fault Isolation - In those cases where isolation down to the LRU cannot be made automatically from the centralized controller with the System operating, fault isolation shall be accomplished from the centralized controller using SMSC or ORTS operator-initiated diagnostics with the system operating or in stand-by. In the event of a centralized controller failure, fault isolation shall be accomplished at the equipment rack via a local maintenance port with the system operating or in stand-by.

3.3.8.5.2 Self-Test - Each System equipment shall include automatic self-test capability at power up and operator initiated self-test capability for use during maintenance actions. The equipment self-test capability shall be integrated into the total system BITE capability. The System shall include a customer-configurable file that defines whether inter-rack testing will be performed upon power up.

3.3.9 Control Interface Requirements - The System shall be capable of being directly controlled by software-driven controllers such as the Sites Master Switch Controller (SMSC) or the Aegis Operational Readiness and Test System (ORTS), using the command set specified in Appendix B, the DTS Interface Design Specification. Command response shall be completed with .5 seconds.

3.4 Factory Testing

Upon completion of each production system, the contractor shall perform testing in accordance with Attachment J.2, DTS Testing Requirements, and provide the results with delivery of the system.

3.5 Installation and Check-Out (INCO)

The contractor shall provide engineering support to oversee the installation of the system(s) /components(s) and provide INCO testing as required by the delivery order. The results of INCO test shall be provided to the Government COR within 10 days of completing the installation.

3.6 Warranty

The contractor shall warrant each system/component delivered to be free from defects in material and workmanship for a period of one year from the date of acceptance. During the warranty period the contractor shall repair or replace any product that proves to be defective. The contractor shall provide telephonic support for calls placed from 0700 to 1900 Eastern Time, Monday through Friday. Telephonic response by contractor personnel knowledgeable of DTS shall be within one (1) hour from the time a call is placed requesting assistance. Telephonic support shall be continuous until the problem is resolved. If the problem cannot be resolved via telephonic assistance within 24 hours, the contractor shall provide on-site assistance within 72 hours from the time the call is placed. When a specific part/LRU is identified as faulty, the Government shall ship the part/LRU to the contractor for repair/replacement. Repair/replacement shall be completed within five working days from the time the defective item is received at the contractor's facility, subject to the availability of all materials necessary to effect the repair /replacement. If all materials necessary to effect the repair/replacement are not currently available, the contractor shall provide the date when repairs/replacement will be completed within five working days from the time the defective item is received. In no event will the repair/replacement date be more than four months from receipt. Should the anticipated repair/replacement timeframe be more than four months, the contractor shall propose an alternative solution for Government consideration. The contractor shall be responsible for return of the repaired/replacement part/LRU to the Government site. All repaired or replaced items shall be warranted for the remainder of the original warranty period. This warranty shall not apply to defects resulting from improper or inadequate maintenance,

unauthorized modifications or misuse, or use outside of the stated operational environmental conditions.

3.7 Repair

Upon failure of a LRU specified as a Repair ELIN in Exhibit R, the Government may send (at the Government's expense) the item back to the contractor for a repair feasibility assessment. Within 30 days of receipt of the failed LRU, the contractor shall perform a repair feasibility assessment at no cost to the Government. If the LRU is deemed repairable, the Government may place an order to have the item repaired at the price specified in Section B. Repairs shall be completed and the LRU returned to the Government within 30 days of receipt of order. If the LRU is deemed beyond economical repair (repair costs greater than 75% of price of a new LRU), the contractor shall inform the Government by providing a report documenting the estimated repair cost. The Government may place an order to have the LRU repaired on a Time and Materials basis or request the contractor to return or dispose of the item.

3.8 Training

3.8.1 Operation and Maintenance Training – The contractor shall train the Government personnel in the theory of operation, general, physical and functional description, normal and casualty operation of the DTS system and components, maintenance diagnostics (fault detection and isolation), accessing field replaceable parts (LRUs), and the performance of unscheduled (Corrective Maintenance) and scheduled/periodic (Preventative Maintenance System (PMS)) maintenance. The contractor shall provide a minimum of 16 student contact hours of classroom and laboratory training per system for up to 10 site personnel in the operation and maintenance of the system.

3.8.2 Training Documentation – The contractor shall provide up to date Trainee Guides for each person attending the class. The Trainee Guides will serve as reference material after completion of the class.

Appendix A: Glossary

AC	Alternating Current
ANSI	American National Standards Institute
BIT	Built-In Test(s)
BITE	Built-In Test Equipment
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
dB	Decibels
DC	Direct Current
DTS	Data Transfer System
EMI	Electromagnetic Interference
F/O	Fiber Optic
Hz	Hertz (cycles per second)
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
INCO	Installation and Checkout
I/O	Input/Output
LRU	Lowest Replaceable Unit
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NATO	North Atlantic Treaty Organization
NTDS	Naval Tactical Data System
ORTS	Operational Readiness and Test System
PBER	Path Bit Error Rate
PMS	Preventative Maintenance System
SIL	Speech Interference Levels
SMSC	Site Master Switch Controller
UL	Underwriters Laboratories
VAC	Volts Alternating Current
VDC	Volts Direct Current
VRMS	Volts Root Mean Square

Appendix B: Data Transfer System Interface Design Specification

See 91 pages that follow.

	DTS	A	Incorporated ECN 3000001	97 Apr 22	L. Johnson
		B	Incorporated ECN 3000002		
		C	Incorporated ECN 30000??	98 May 4	M. Clark
		D	Miscellaneous Cleanup	98-May-22	M. Clark
		E	Miscellaneous Cleanup	99-Feb-01	M. Tseng
		F	Miscellaneous Cleanup	99-Aug-11	M. Tseng
		G	Miscellaneous Cleanup	01-APR-05	M. Tseng
		H	Miscellaneous Cleanup	01-AUG-03	M. Tseng

CONTRACT NO. N00178-96-C-2001			CABLE & COMPUTER TECHNOLOGY INC 1555 SOUTH SINCLAIR STREET, ANAHEIM, CALIFORNIA 92806 (714) 937-1341			
APPROVALS		DATE				
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ISSUED	M. Starzyk	96/12/20			SHEET 1 OF 91	

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1. General

This document describes the communications to and the responses from the DTSC. These communications can occur over three types of ports. The SMSC ports, four Ethernet and a maximum of five RS232, are attached to the Server HUB. For maintenance purposes, Local Maintenance Terminals (LMTs) can be attached to any Extender Bridge Card. A maximum of ten Local Maintenance Terminals may be active at any one time. The Ethernet and RS232 limits are the maximum number of physical ports of these devices that are available on the Server HUB. The limitation on the Local Maintenance Terminals is due to resource allocation in the software. Nine LMTs are provided in a fully populated HUB, one per rack. All SMSC commands must be terminated with a <CR>.

1.1 Acronyms and Glossary

<u>Name</u>	<u>Description</u>
LMT	: Local Maintenance Terminal, a hand held device with alpha numeric key pad and LCD display which can be connected to the Extender Bridge Module as input device to enter commands for maintenance activities. The Extender Bridge Module will enable the LMT functions only when the DTS is placed in "Diagnostic Mode" by one or more SMSC communication ports. The LMT is disabled when all SMSC communication ports are in the "Operational Mode".
Resource	: A physical component; device in the DTS that is used in constructing a path for data transfer between two ports. Resources are divided into two groups : Switching Resources and Processing Resources.
Switching Resource	: Physical components; devices that connected together to form a physical path for data transfer between two ports. Example of Switching Resources include: registers on the Port Interface Board, Fiber Optic Transceiver, cross point switch.
Processing Resource	: The CPU devices; micro-processors which control the switching resources to construct a path for data transfer. The processing resources include: Client HUB, Extended Bridge Modules (EBMs in HUB cage and Port Interface Cage), micro-processor on the Cage Router, FOT/FOR router, FOM.
Symmetrical Resources	: Default topology between the FOT/FOR and FOM as constructed by the DTS Configurator where: all channels on the FOT/FOR are evenly and sequentially distributed amongst all FOM boards in the HUB. For example : FOT/FOR channel 0 is connected to FOM channel 0 (HUB 1 FOM Board 0) FOT/FOR channel 1 is connected to FOM channel 32 (HUB 1 FOM Board 1) FOT/FOR channel 2 is connected to FOM channel 64 (HUB 1 FOM Board 0) etc.....

This process continues until all FOT/FOR in a HUB are assigned OR all

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<u>Name</u>	<u>Description</u>
	FOM channels in the HUB are assigned whichever comes first.
Non-Symmetrical Resources	: User defined topology between FOT/FOR and FOM on a channel by channel basis, as manually entered through the DTS configurator. The following non-symmetrical topologies are supported: FOT to FOR FOT/FOR to FOM (different from the default symmetrical assignment) FOM to FOM
Broadcast Link	: An one-to-many link where: one port requests data (Control Port), one port broadcasts data (Input Port), all other ports in the link receives data only (Member Port).
Input Port	: The port that broadcasts data (Broadcaster) in a Broadcast Link (also known as Link Many). The data is transmitted only when it receives a request from the Control Port.
Control Port	: The port that requests data (Requester) and receives broadcast data in a Broadcast Link. This port should be the "farthest away" from the Input Port to ensure that all the Member Ports received the broadcast data before requesting the next data.
Member Port	: The port that receives broadcast data only (Participant) in a Broadcast Link.
Password	: Password used to enable "write" to device registers, database, configurable parameter file in the Diagnostic Mode. The password is 10 characters long, comprised of alpha-numeric characters without space and no special characters allowed.
Cage#, Cage Number	: Identification for each cage within a HUB. Cage number 0-15 are Port Interface Cages, Cage Number 16 is the HUB cage, Cage Number 17 is the FOM Cage
Rack#, Rack Number	: Identification for each rack within a HUB. Rack number 0-7 are Port Interface Racks, Rack Number 8 is the HUB Rack.
Server HUB	: A PC based computer that provides the main interface between the DTS and SMSC. It interprets SMSC command and directs the client HUBs to execute command; controls power-up and background tests; maintains the operating configuration database and controls the orderly shutdown of the DTS when required. One Server HUB is required for each DTS system which supports up to 8 Client HUBs.
Client HUB	: A PC based computer with built-in VME interface to provide interface between the Server HUB and Port Interface Cages via EBMs. Client HUB receives command information from the Server HUB then sends the information to the designation PI Cage for execution. It receives the command execution status from the PI Cage and return the status to the Server HUB. One Client HUB is required for supporting up to 16 PI Cages.
CR,CRT	: Cage Router, which provides routing for 32 input ports to 32 output ports within a PI Cage. In a fully configured PI Rack with one Cage Router in each PI Cage, provides routing for 64 input ports to 64 output ports.
FOT	: Fiber Optic Transmitter Router, which provides routing for 32 input ports to 32 fiber paths from the PI Cage to FOMs. In a fully configured PI Rack

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<u>Name</u>	<u>Description</u>
	with one FOT Router in each PI Cage, provides routing for 64 input ports to 64 fiber paths from the PI Cage to FOMs.
FOR	: Fiber Optic Receiver Router, which provides routing for 32 fiber path to 32 output ports from the FOMs to PI Cage. In a fully configured PI Rack with one FOR Router in each PI Cage, provides routing for 64 fiber paths to 64 output ports from the FOMs to PI Cage.
FOM	: Fiber Optic Multiplexer, which provide routing for 32 fiber path inputs from the FOTs to 32 fiber path outputs to FORs.
[]	: Optional parameter
EBM	: Extender Bridge Module, which provides the control and data transfer (Packet Mode and Broadcast) link between the Client HUB and PI Cage. Two EBMs connected with fiber optic cable are required for each PI Cage link. One resides in the HUB Cage while the other resides in the PI Cage.

1.2 General Commands and Responses

The commands and responses are in the general form:

Command Format: cc[,param]...[,param]<CR>

Where: cc is the two-character command
[,param]...[,param] are the parameters required for the command

Response Format:

C[,msg. text] Command completed successfully without further user attention.

W,[nnnnn,]msg. text Command completed with some explanation for possible user action. (Message text limited to 130 characters)

F,[nnnnn,][xxxxx,...yyyyy]msg. Text Command failed as indicated by the message text. (Message text limited to 130 characters)

Where: nnnnn is the 5-digit number of the first port identified in the command being responded to, xxxxx through yyyyy are all ports in error relative to the message.

Notes:

- 1) Leading zeros are optional on input to the DTSC, but will always be provided on outputs to the SMSC ports
- 2) Unless otherwise specified, the port range includes the ASTARTE ports also.
- 3) Warning (W) message is issued only if the command completed, but not in the expected manner. I.e., ports linked using alternate path, etc.
- 4) Failure (F) message issued if command could not be completed.
- 5) All messages to SMSC ports are terminated with <CR> <LF> \$ in Operational Mode, <CR> <LF> * in normal Maintenance Mode, and <CR> <LF> # in Maintenance Mode when IW, RW, and SW commands are enabled.

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- 6) W and F responses for individual command examples are for conditions unique to the individual command. General failure messages involving syntax, etc. are shown in the table below.
- 7) All examples assume a fully populated system with 16 FOMs in each HUB, and unless otherwise specified, symmetrical links on the Fiber Optics.

Table 1 – Common Command Response Error Messages

Error		Message
1.	COM port number error	F,cc,n, INVALID RS232 PORT NUMBER<CR> <LF> \$ Where "cc" is the command, and "n" is the invalid port number
2.	First 2 characters not recognized by parser	F,cc, UNRECOGNIZED COMMAND<CR> <LF> \$ Where "cc" is the command
3.	Not enough parameters for specified command	F,string, NOT ENOUGH PARAMETERS <CR> <LF> \$ Where "string" is the command as entered
4.	Too many parameters for specified command	F,string, TOO MANY PARAMETERS <CR> <LF> \$ Where "string" is the command as entered
5.	Parameter not valid for specified command	F,cc,ppppp, INVALID PARAMETER<CR> <LF> \$ Where "cc" is the command, and ppppp is the invalid parameter
6.	Attempt to execute a DM only command while in OM. Result: No change to database or hardware	F,cc,COMMAND NOT SUPPORTED IN OPERATIONAL MODE<CR> <LF> \$ Where "cc" is the command
7.	Attempt to execute IW, RW, or SW commands when password was not used to enter DM. Result: No change to database or hardware	F,cc,COMMAND NOT SUPPORTED UNLESS PASSWORD USED TO ENTER DIAGNOSTIC MODE<CR> <LF> \$ Where "cc" is the command
8.	Ports belong to Astarte switch Result: No change to database or hardware	F,cc,nnnnn, COMMAND NOT SUPPORTED FOR ASTARTE SWITCH<CR> <LF> \$ Where "cc,nnnnn" is the command and the 1 st port #
9.	Port 1 and Port 2 not on same Astarte switch Result: No change to database or hardware	F,nnnnn,mmmmm, NOT ON SAME ASTARTE SWITCH<CR> <LF> \$ Where "nnnnn,mmmmm" are the two ports
10.	Astarte link failed	F,cc,nnnnn, ASTARTE ERROR CODE; <i>error_code</i> <CR> <LF> \$ Where "cc,nnnnn" is the command and the 1 st port #
11.	Port 1 and Port 2 not the same type Result: No change to database or hardware	F,cc,nnnnn, <i>port1=type1, port2=type2</i> , PORT TYPE MISMATCH <CR> <LF> \$ Where "cc,nnnnn" is the command and the 1 st port # <i>port1</i> & <i>port2</i> are the mismatched ports <i>type1</i> & <i>type2</i> are the types shown in the db

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Table 1 – Common Command Response Error Messages

Error		Message
12.	Attempt to link or break a port in Diagnostic Mode that is part of a link made in Operational Mode Result: No change to database or hardware	F,cc,nnnnn,[mmmmm,] CANNOT BREAK OPERATIONAL MODE LINK<CR> <LF> * Where "cc,nnnnn" is the command and the 1 st port # "mmmmm" is the port in error
13.	Attempt to link or break a port in Diagnostic Mode that was made by another terminal in Diagnostic Mode Result: No change to database or hardware	F,cc,nnnnn,[mmmmm,] CANNOT BREAK A LINK MADE BY ANOTHER TERMINAL<CR> <LF> * Where "cc,nnnnn" is the command and the 1 st port # "mmmmm" is the port in error
14.	Time out on sending command to the HUB, Cage Extender Bridge or components in a cage. Result: No change to database or hardware	F,cc,nnnnn, <i>component</i> , <i>component id</i> FAILED COMMUNICATION<CR> <LF> \$ Where "cc,nnnnn" is the command and the 1 st port # " <i>component</i> " is one of the items listed below: <div style="margin-left: 40px;"> HC EXT HUB to Cage Extender Bridge CH EXT Cage to HUB Extender Bridge HH EXT HUB to HUB Extender Bridge FOM Fibber Optic Multiplexer CR Cage Router in PI Cage FOT FOT Router in PI Cage FOR FOR Router in PI Cage </div> " <i>component id</i> " is the id number of the component
15.	Database indicates resource not installed Result: No change to database or hardware	F,cc,nnnnn, <i>resource id</i> NOT INSTALLED<CR> <LF> \$ Where: "cc,nnnnn" is the command and the 1 st port # <i>resource</i> = PORT, CR, FOT, FOR, or FOM. <i>id</i> = Channel # of <i>resource</i>
16.	Database indicates resource nnnnn being Hot Swapped Result: No change to database or hardware	F,cc,nnnnn, <i>resource id</i> BEING HOT SWAPPED <CR> <LF> \$ Where: "cc,nnnnn" is the command and the 1 st port # <i>resource</i> = PORT, CR, FOT, FOR, or FOM. <i>id</i> = Channel # of <i>resource</i>
17.	Database indicates resource nnnnn failed Result: No change to database or hardware	F,cc,nnnnn, <i>resource id</i> FAILED<CR> <LF> \$ Where: "cc,nnnnn" is the command and the 1 st port # <i>resource</i> = CR, FOT, FOR, or FOM. <i>id</i> = Channel # of <i>resource</i>
18.	Database indicates port(s) nnnnn [and mmmmm] failed for on card paths Result: 1) Alternate path attempted using Cage Router. If Successful: 2) If Verify fails using Cage Router:	W,cc,nnnnn,[mmmmm,] PORT FAILED FOR ON CARD PATHS – ALTERNATE PATH ESTABLISHED USING CAGE ROUTER <CR> <LF> \$ F,cc,nnnnn,[mmmmm,] PORT FAILED FOR ON CARD PATHS AND VERIFY FAILED FOR CAGE ROUTER PATH<CR> <LF> \$ Where "cc,nnnnn" is the command and the 1 st port # "mmmm" is the port in error

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Table 1 – Common Command Response Error Messages

Error	Message
<p>19. Database indicates port(s) nnnnn [and mmmmm] failed for Cage Router paths</p> <p>Result: 1) Alternate path attempted using FOT/FOM/FOR Routers. If Successful:</p> <p style="padding-left: 40px;">2) If Verify fails using FOT/FOR:</p>	<p>W,cc,nnnnn,[mmmmm,] PORT FAILED FOR CAGE ROUTER PATHS – ALTERNATE PATH ESTABLISHED USING FOT/FOR ROUTERS <CR> <LF> \$</p> <p>F,cc,nnnnn,[mmmmm,] PORT FAILED FOR CAGE ROUTER PATHS AND VERIFY FAILED FOR FOT/FOR PATH<CR> <LF> \$</p> <p>Where “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">“mmmm” is the port in error</p>
<p>20. Database indicates port(s) nnnnn [and mmmmm] failed for FOT/FOR Router paths</p> <p>Result: 1) Alternate path attempted using Packet Mode. If Successful:</p> <p style="padding-left: 40px;">2) If Verify fails using Packet Mode:</p>	<p>W,cc,nnnnn,[mmmmm,] PORT FAILED FOR FOT/FOR ROUTER PATHS – ALTERNATE PATH ESTABLISHED USING PACKET MODE<CR> <LF> \$</p> <p>F,cc,nnnnn,[mmmmm,] PORT FAILED FOR FOT/FOR ROUTER PATHS AND VERIFY FAILED FOR PACKET MODE<CR> <LF> \$</p> <p>Where “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">“mmmm” is the port in error</p>
<p>21. Database indicates port(s) nnnnn [and mmmmm] failed for Packet mode paths</p> <p>Result: No change to database or hardware</p>	<p>F,cc,nnnnn,[mmmmm,] PORT FAILED FOR PACKET MODE PATHS <CR> <LF> \$</p> <p>Where “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">“mmmm” is the port in error</p>
<p>22. Database USAGE field contents invalid for this resource</p> <p>Result: No change to database or hardware</p>	<p>F,cc,nnnnn,resource,id :USAGE, DATABASE ERROR <CR> <LF> \$</p> <p>Where: “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">resource = PORT, CR, FOT, FOR, or FOM.</p> <p style="padding-left: 40px;">id = Channel # of resource</p>
<p>23. Database TYPE field contents invalid for this resource</p> <p>Result: No change to database or hardware</p>	<p>F,cc,nnnnn,PORT,id :TYPE , DATABASE ERROR <CR> <LF> \$</p> <p>Where: “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">id = Channel # of PORT</p>
<p>24. Database INPUT field contents invalid for this resource</p> <p>Result: No change to database or hardware</p>	<p>F,cc,nnnnn,resource,id :INPUT , DATABASE ERROR <CR> <LF> \$</p> <p>Where: “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">resource = PORT, CR, FOT, FOR, or FOM.</p> <p style="padding-left: 40px;">id = Channel # of resource</p>
<p>25. Database OUTPUT field contents invalid for this resource</p> <p>Result: No change to database or hardware</p>	<p>F,cc,nnnnn,resource,id :OUTPUT , DATABASE ERROR<CR> <LF> \$</p> <p>Where: “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">resource = FOT or FOR.</p> <p style="padding-left: 40px;">id = Channel # of resource</p>
<p>26. Failed verify after link, nnnnn to mmmmm</p> <p>Result: Link made, nnnnn to mmmmm resources usage marked failed</p>	<p>F,cc,nnnnn,nnnnn TO mmmmm, PATH VERIFY ERROR<CR> <LF> \$</p> <p>Where: “cc,nnnnn” is the command and the 1st port #</p> <p style="padding-left: 40px;">mmmmmm is the second port</p>

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Table 1 – Common Command Response Error Messages

Error	Message
27. Failed verify after link, mmmmm to nnnnn Result: Link made, mmmmm to nnnnn resources usage marked failed	F,cc,nnnnn, mmmmm TO nnnnn, PATH VERIFY ERROR<CR> <LF> \$ Where: "cc,nnnnn" is the command and the 1 st port # mmmmm is the second port
28. Failed verify after link, both directions Result: Link made, nnnnn to mmmmm resources and mmmmm to nnnnn resources usage marked failed	F,cc,nnnnn, PATH VERIFY ERROR, BOTH DIRECTIONS<CR> <LF> \$ Where: "cc,nnnnn" is the command and the 1 st port #
29. Attempt to link two Type D ports in Packet Mode from one of the following: 1. LP with two ports in different HUBs 2. LP with two ports in the same PI cage or rack whose normal Cage Router path and alternate FOT/FOM/FOR paths are not available. 3. LP with two ports in the same HUB, different racks whose normal FOT/FOR/FOM paths not available 4. LD with Packet Mode specified. Result: No change to database or hardware	F,cc,nnnnn,CAN NOT LINK TYPE D PORTS IN PACKET MODE.

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2. Operational Mode Commands

The operational mode Commands are used to set, break, and display connections. The SMSC sends a two-character command followed by required parameters to the DTSC. When in the Operational Mode, all DTSC responses to SMSC commands are terminated by <CR> <LF> \$. When operational commands are used in the Diagnostic Mode, all DTSC responses are terminated by <CR> <LF> *. The Operational Mode commands available for control of the Data Transfer System are listed in the following table.

Table 2 – Operational Mode Command List		
Command	Function	Comments
BP	Break Port	
BR	Break Range	
DF	Display Free	From Server HUB Database
DL	Display Linked	From Server HUB Database
DM	Diagnostic Mode	Not available on LMT
DN	Display Configured NTDS port type	
DP	Display Port	From Server HUB Database
DT	Display Type	From Server HUB Database
EM	Error Message	Not available on LMT
GM	Get Error Message	Not available on LMT
HE	Help	
LM	Link Many	
LP	Link Port	
LS	Link Special Low Latency	
OM	Operational Mode	Cancels the Error Message mode Not available on LMT
PF	Print ofF	
PN	Print oN	
RS	ReSet	Not available on LMT
SC	Set Communications	Not available on LMT
VF	Verify path ofF	
VN	Verify path oN	
VP	Verify Path	

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2.1 BP (Break Port)

The Break Port command will break any links connected to the specified port. Port (nnnnn) range is from 0 to the maximum port number. Which ports are broken depends upon how the port was linked. The following table defines the rules for breaking the port connections.

Table 3 – Break Port Rules			
Linked by	Port Usage	Action/ Description	Response
Not Linked	N/A	Failure message	F,cc,nnnnn,nnnnn,PORT NOT LINKED<CR> <LF> \$
LD, LP, LS	N/A	Break link to nnnnn	C<CR> <LF> \$
LM	nnnnn = Input	Break the link many Broadcast Mode chain	C<CR> <LF> \$
LM	nnnnn = Control	Break the link many Broadcast Mode chain	C<CR> <LF> \$
LM	nnnnn = Output	Break port nnnnn only, from the link many Broadcast Mode chain	C<CR> <LF> \$
IN OM	N/A	BP in DM on link made in OM	F,cc,nnnnn,nnnnn,CANNOT BREAK OPERATIONAL MODE LINK<CR> <LF> *
IN DM	N/A	BP in DM on link made by another DM port or terminal	F,cc,nnnnn,nnnnn,CANNOT BREAK A LINK MADE BY ANOTHER TERMINAL<CR> <LF> *
LM	Any	Broadcast chain corrupted in database	F,cc,nnnnn,nnnnn,DATABASE ERROR, BROADCAST CHAIN CORRUPTED<CR> <LF> \$

Format: BP,nnnnn<CR>

In the following examples, Ports 2011-2014 are linked in a broadcast chain with port 2011 as the input port and 2012 as the control port.

Command Example 1: Break links connected to port 02011. Command will cause ports 02012, 02013, 02014 to also be broken since they were linked with the LM command and port 02011 was the (nnnnn) input device port.

SMSC sends: BP,02011<CR>

DTSC Response: As listed in Table 3

Command Example 2: Break only one output device, port 02013, from a Broadcast Mode chain. Since 02013 is not the input port, nor the control port, only 02013 will be broken from the chain.

SMSC sends: BP,02013<CR>

DTSC response: As listed in Table 3

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2.2 BR (Break Range)

The Break Range command will break any links within the specified range. Port range is from 0 to Last Port, and 99999. The BR (break range) command follows the same rules as the BP (break port) command. Note that a Break Range 0,99999 will operate as a break all links. On the Local Maintenance terminal, when using the menu, only one port at a time may be requested.

Format:	BR,sssss,eeee<CR>
Where:	sssss = start range port number eeee = end range port number
Command Example:	Break range command will break ports 02001 - 02050.
SMSC sends:	BR,02001,02050<CR>
DTSC response:	C<CR> <LF> \$

2.3 DF (Display Free)

The Display Free command will display ports within the specified range that are currently not linked and are available for service (i.e., at least one of the 4 path type is available). Only ports in the selected range will be queried. A Display Free command with range 00000 to 99999 will display all free ports. On the Local Maintenance terminal, when using the menu, only one port at a time may be requested. This information is taken from the database, no hardware interrogation is involved. Links made in diagnostic mode are considered free unless they are marked failed.

Format:	DF,sssss,eeee<CR>
Where:	sssss = start range port number eeee = end range port number
Command Example:	Display free ports in the range of 02000 to 02005
SMSC sends:	DF,02000,02005<CR>
DTSC response:	C,02002/.../02005<CR> <LF> \$

2.4 DL (Display Linked)

The Display Linked command will display ports within the specified range that are currently linked and the port to which they are linked. Only ports in the selected range will be queried. A Display Linked command with range of 00000 to 99999 will display all linked ports. On the Local Maintenance terminal, when using the menu, only one port at a time may be requested. This information is taken from the database, no hardware interrogation is involved. The DTSC will respond with a message in the following general form:

1. List all the links in the ascending order of the port number. Each port is only listed on its first occurrence.
2. All links are separated by a "/".
3. The Broadcast Mode links are preceded by a "B". They are listed in the order of input port, control port, output port(s). Multiple output ports are listed in the order that they were added to the chain.

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Format: DL,sssss,eeee<CR>
Where: sssss = start range port number
 eeee = end range port number

DTSC response: C[,B,IN,CTL,port1,port2,.../ B,IN,CTL,portx,porty,...
 /...../nnnnn,mmmmm/.....]<CR> <LF> \$

Where: B = Broadcast Mode
 IN = Input port number
 CTL = control port number
 port1,2,x,y = port numbers of ports linked in Broadcast Mode
 nnnnn,mmmmm = port numbers of ports linked, in low latency or Packet Mode

Command Example 1: Display linked ports in the range of 02000 to 02006
SMSC sends: DL,02000,02006<CR>
DTSC response: C,02000,02001/02003,02004<CR> <LF> \$

Command Example 2: Display linked ports in the range of 02000 to 02010. The Link Many chain is 02000 to 02001, 02003, and 02005. Port 02005 is the control port. Ports 02010, 02020 are linked in low latency. Port 2006 is linked to port 10 in Packet Mode.
SMSC sends: DL,02000,02010<CR>
DTSC response: C,B,02000,02005,02001,02003/02006,00010/02010,02020 <CR> <LF> \$

2.5 DM (Diagnostic Mode)

The Diagnostic Mode command will place the communication port that issued the command into the diagnostic mode. No other DTSC operating parameters for that port will be changed, i.e., EM port designation, or any communication port settings. Any time that any one of the SMSC ports is in the Diagnostic Mode, each of the Local Maintenance Terminals and the keyboard on the Server HUB are also enabled for sign-on. The prompt is changed to an "***". An OM command issued when a port is in Diagnostic Mode will return that port to the Operational Mode without effecting any other port parameters. If a previously established password is added to the DM command, then the IW, RW, and SW commands are enabled and the prompt is changed to #.

Format: DM[,pass]<CR>
Where: pass = the previously established password (see System Write and config.txt file)

Command Example 1
SMSC sends: DM
DTSC response: C<CR> <LF> *

Command Example 2
SMSC sends: DM,pass<CR>
DTS response: C<CR> <LF> #

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Note: the password entered is echoed as "@@@" where number of @ is the same as number of character in the password.

or
W,INVALID PASSWORD, IW, RW & SW NOT
ENABLED<CR><LF>*

2.6 DN (Display NTDS Port Type)

The Display NTDS Port Type command will display the type of installed NTDS ports within the specified range as configured in the database. This information is retrieved from the database without interrogation of actual hardware installed in the field.

Format: DN,sssss,eeee<CR>
Where: sssss = start range port number
eeee = end range port number
General Response C,xxxx,type/nnnn,type/.../yyyy,type<CR><LF>\$
Where: type can be:
A through H = NTDS Types A through H
J or K = NTDS Types J or K
DF = Direct Fiber (Astarte)

The un-configured ports are NOT listed.

Command Example 1: Display type of ports 02004 through 02015.
SMSC sends: DT,02004,02015<CR>
DTSC Response: C,02004,A/02005,B/02006,B/02007,B/02012,D/02013,D
/02014,E /02015,E <CR><LF>\$

Note: ports 2008 through to 2011 inclusive are not configured.

Command Example 2: Display type of port 04097.
SMSC sends: DN,04097,04097<CR>
DTSC Response: C,04097,DF<CR><LF>\$

2.7 DP (Display Port)

The Display Port command will display the status of ports (linked or available for use). Only ports in the selected range will be queried. Ports that are tagged as "failed" or "being Hot Swapped" are not displayed. A Display Port command with range 0 to 99999 will display the status of all ports. Ports that are linked (by LM or LP, LS) will be displayed in the same way as the DL command. Ports that are not linked will be displayed as single port address separated by "/". On the Local Maintenance terminal, due to the limited display area, only one port at a time may be requested. This information is taken from the database, no hardware interrogation is involved.

Format: DP,sssss,eeee<CR>
Where: sssss = start range port number
eeee = end range port number
General Response: C,xxxx/nnnnn,mmmm/.../yyyy<CR><LF>\$

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Command Example: Display the status for ports in the 02000 to 02015 range where:
Ports 02001 to 02005 were previously linked using LM with input port 02002 and control port 02005. Ports 02006 to 02009 were also linked using LM, with input port 02009 and control port 02007. Ports 02011 to 02014 were linked using LP, all other ports are unlinked.

SMSC sends: DP,02000,02015 <CR>
DTSC response: C,02000/B,02002,02005,02001,02003,02004/
B,02009,02007,02006,02008,02010/02011,02014/02012/
02013/02015 <CR> <LF> \$

2.8 DT (Display Type)

The Display Type command will display the type of the identified port (nnnnn) within the specified range. All ports are displayed, including the uninstalled ports. This information is retrieved from the database without interrogation of actual hardware installed in the field.

Format: DT,sssss,eeeeee <CR>
Where: sssss = start range port number
eeeeee = end range port number

General Response C,xxxxx,type/nnnnn,type/.../yyyyy,type <CR> <LF> \$
Where: type can be:
A through H = NTDS Types A through H
J or K = NTDS Types J or K
DF = Direct Fiber (Astarte)
NI = Not Installed

Command Example 1: Display type of ports 02010 through 02015.
SMSC sends: DT,02010,02015 <CR>
DTSC Response: C,02010,NI/02011,NI/02012,D/02013,D /02014,E /02015,E
<CR> <LF> \$

Command Example 2: Display type of port 04097.
SMSC sends: DT,04097,04097 <CR>
DTSC Response: C,04097,DF <CR> <LF> \$

2.9 EM (Error Message)

The Error Message command will put the specified DTSC RS232 communications port into an output Error Message mode. (This command is not available on the Ethernet ports). While in the EM mode, the DTSC will continue to process commands sent over this communication port. Any state change in the DTSC that reduces functionality or capability will be reported as soon as possible over this port. If more than one port is in Error Message mode, all error messages will be reported on all EM ports. All error messages will always be saved on disk, up to a maximum number of characters. After which, the oldest error messages will be lost while new ones are added. When in Operational Mode, an OM command issued from a port in Error Message mode will cancel the Error Message mode. If a port is in both Error Message mode and Diagnostic Mode, then

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an OM will return the port to the Operational Mode without effecting the Error Message mode. An RS or ^Z will also cancel the Error Message mode, however they will also set the communications parameters for that port to their default values.

Note: Any error messages in response to a command will be returned to the SMSC via the same communication port as the one that sent the command.

Format:	EM[,n]<CR>
General Response	C<CR><LF>\$
or	F,EM CANNOT BE ASSIGNED TO AN ETHERNET PORT <CR><LF>\$
or	F,n,COMMUNICATIONS PORT ALREADY ASSIGNED TO OUTPUT ERROR MESSAGE MODE
Command Example:	Put communication port 2 into Error Message mode.
SMSC sends:	EM,2<CR>
DTSC response:	C<CR><LF>\$

2.10 GM (Get error Messages)

The Get error Messages command will cause the DTSC to send all or a specified number of the error messages queued to the SMSC via the communication port that issued the command. These are the error messages queued for the EM port. DTSC will send the error messages in chronological order (i.e., the oldest message in the queue is sent first). All error messages sent will be removed from the queue and will not be available. Any message queued while GM is in-progress will not be included.

If the number of messages requested is greater than what the system can output at one time, then the maximum number of messages that can be output will be sent. In addition, a message will be sent following the last error message to instruct the user to issue another GM command to get the remaining messages. If the user chooses not to get the remaining messages, then no further action will be taken. Messages not sent will remain in the message file.

Format:	GM[,n]<CR>
Command Example 1:	Get the 5 most recent error messages.
SMSC sends:	GM,5<CR>
DTSC response:	C,W,message 1<CR><LF>/...<CR><LF>/F,message 5<CR><LF>\$
or	C<CR><LF>\$ If no messages found or n=0
Command Example 2:	Get all queued error messages (up to the maximum buffer size).
SMSC sends:	GM<CR>
DTSC response:	C,W,message 1<CR><LF>/...<CR><LF>/F,message n<CR><LF>\$
or	C<CR><LF>\$ If no messages found

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Command Example 3: Get all queued error messages.
 SMSC sends: GM<CR>
 DTSC response: C,W,message 1<CR><LF>/...<CR><LF>/F,message
 n<CR><LF> INPUT GM TO GET REMAINING
 MESSAGES<CR><LF>\$ If the number of messages stored
 is greater than system buffer will handle.

2.11 HE (HElp)

The HELP command will display online information.

Format: HE[,cc]<CR>
 Where: cc = help about a command, if null, list of all commands

Command Example: Display the help menu.
 SMSC sends: HE<CR>
 DTSC response:

C,BP - Break Port, BR - Break Range, DF - Display Free, DL - Display Linked, DM - Diagnostic
 Mode<CR><LF>
 DP - Display Port, DT - Display Type EM - Error Message, GM - Get error Messages, HE - Help<CR><LF>
<CR><LF>
<CR><LF>
VF - Verify path ofF, VN - Verify path oN, VP - Verify Path<CR><LF>\$

Note: Each line limited to a maximum of 80 characters.

2.12 LM (Link Many)

The Link Many command is used to link many output device ports (mmmmm) to one input device port (nnnnn) in Broadcast Mode. Broadcast Mode is available for NTDS type A and B only. The one to many link is created using a series of LM commands with the same input port number. To start a new Broadcast link, all links to the input port must be broken prior to the *first* LM command. The first LM command of the series assigns port mmmmm as the control port of the Broadcast Mode data transfer. **Warning, the control port cannot be on the same PI card as the input port.** The following table specifies the other rules for assigning the ports.

Table 4 – Link Many Ports Assignment Rule					
Port nnnnn Current Usage			Action		
Linkage	Data Transfer Mode	nnnnn to mmmmm	Port nnnnn	Port mmmmm	DTSC Response Message
Not linked	None	mmmmm on a different PI Card than nnnnn	Assign nnnnn to Broadcast Mode input port	Break existing link to mmmmm Assign mmmmm to Broadcast Mode the control port	C,mmmmm,IS CONTROL PORT,BROADCAST ID i <CR><LF>\$

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Table 4 – Link Many Ports Assignment Rule

Port nnnnn Current Usage			Action		
Linkage	Data Transfer Mode	nnnnn to mmmmm	Port nnnnn	Port mmmmm	DTSC Response Message
		mmmmm on same PI card as nnnnn	No change to nnnnn.	No change to mmmmm	F,LM,nnnnn, CANNOT ASSIGN INPUT AND CONTROL PORT ON SAME PI CARD <CR> <LF> \$
N/A	Not applicable	nnnnn or mmmmm not Type A or B	No change to nnnnn.	No change to mmmmm	F,LM,nnnnn, BROADCAST MODE AVAILABLE FOR TYPES A AND B ONLY <CR> <LF> \$
Linked	Not Broadcast	-	No change to nnnnn.	No change to mmmmm	F,LM,nnnnn, NOT A BROADCAST INPUT <CR> <LF> \$
Linked	Broadcast mode	-	No change to nnnnn	Break all links to mmmmm Add mmmmm to the link many list	C,mmmmm,ADDED TO LINK,BROADCAST ID i<CR> <LF> \$
		nnnnn is not a Broadcast input	No change to nnnnn.	No change to mmmmm	F,LM,nnnnn, BROADCAST MODE AVAILABLE FOR TYPES A AND B ONLY <CR> <LF> \$
		mmmmm in this chain	No change to nnnnn	No change to mmmmm	F,LM,mmmmm,ALREADY A PART OF THIS CHAIN
		mmmmm = nnnnn	No change to nnnnn	No change to mmmmm	F,LM,nnnnn,CANNOT LINK BROADCAST TO SELF <CR> <LF> \$
		Link broken in database	No change to nnnnn	No change to mmmmm	F,LM,nnnnn,DATABASE ERROR, LOST OR BROKEN LINK

Note: Broadcast ID is assigned by the system, from 1 to 31.

Format: LM,nnnnn,mmmmm[/nnnnn,kkkkk]<CR>

Where: nnnnn = input device port number range from 0 to the maximum port number.
mmmmm & kkkkk = different output device port numbers range from 0 to the maximum port number.

Command Example: Link one input port 02010 to output ports 02011,02012,02013. Port 02012 will be the Control Port for this chain.

SMSC sends: LM,02010,02012<CR>

DTSC response: Possible messages as described in Table 4 above.

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SMSC sends:	LM,02010,02011 <CR>
DTSC response:	Possible messages as described in Table 4 above.
SMSC sends:	LM,02010,02013 <CR>
DTSC response:	Possible messages as described in Table 4 above.

2.13 LP (Link Port)

The Link Port command will break any links connected to the two specified ports (even if the linked port is in Hot Swap), then link the two specified ports together. This command will also link multiple pairs of ports, separated by a "/". Ports (nnnnn or mmmmm) can range from 00000 to the maximum port number. *Due to display limitations, linking multiple pairs is not allowed on the Local Maintenance Terminal.*

Link Single Pair

Format:	LP,nnnnn,mmmmm <CR>
Where:	nnnnn is the first port number mmmmm is the second port number
Command Example:	Make a single link from port 02010 to 02011.
SMSC sends:	LP,02010,02011 <CR>
DTSC response:	C <CR> <LF> \$
or	W,LP,nnnnn,mmmmm, PORTS FAILED <i>path type</i> PATHS – ALTERNATE PATH ESTABLISHED USING <i>alternate paths</i> <CR> <LF> \$ See Table 1 for " <i>path type</i> " and " <i>alternate paths</i> "

Link Multiple Pairs

Format:	LP,nnnnn,mmmmm/xxxxx,yyyyy[/wwwww,zzzzz] <CR>
Where:	nnnnn is the first port number mmmmm is the second port number xxxxx,yyyyy and wwwww,zzzzz are additional port pairs
Command Example:	Make a single link from port 02010 to 02011 and another single link from port 02012 to 02013
SMSC sends:	LP,02010,02011/02012,02013 <CR>
DTSC response:	C/C <CR> <LF> \$
or	C/W,LP,02012,02013, PORTS FAILED <i>path type</i> PATHS – ALTERNATE PATH ESTABLISHED USING <i>alternate paths</i> <CR> <LF> \$ See Table 1 for " <i>path type</i> " and " <i>alternate paths</i> "

2.14 LS (Link Special low latency)

The Link Special low latency command provides the ability to link two ports using non-symmetrical fiber optic connections. Switching resources that are marked in the database as non-symmetrical can only be used operationally by the LS command. Non-symmetrical paths that can be implemented include, direct connection of ports between two different HUBs, paths between FOT/FOR routers without a FOM, and paths using two FOMs.

The configurator must be used to setup the database for any non-symmetrical resources.

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1. If one or both ports are already linked using either symmetrical or non-symmetrical resources, then the existing links will be automatically broken first then linked using the available non-symmetrical resources.
2. If special, non-symmetrical resources are not available, then other alternate resources will be used to link the ports. In this case, a warning message will be issued to indicate "alternate path" linked.
3. This command is not applicable to the Direct Fiber ports (Astarte).

This command will also link multiple pairs of ports, separated by a "/". The port numbers (nnnnn or mmmmm) must be in the range between 0 and the maximum port number. Due to display limitations, linking multiple pairs is not allowed on the Local Maintenance Terminal.

Link Single Pair

Format:	LS,nnnnn,mmmmm <CR>
Where:	nnnnn is the first port number mmmmm is the second port number
Command Example:	Make a single special low latency link from port 00010 to 02011.
SMSC sends:	LS,00010,02011 <CR>
DTSC response:	C<CR> <LF> \$
or	W,LS,00010,02011, PORTS LINKED USING ALTERNATE PATH , NON-SYMMETRICAL RESOURCES NOT AVAILABLE TO PROVIDE THIS PATH<CR> <LF> \$

Link Multiple Pairs

Format:	LS,nnnnn,mmmmm/xxxxx,yyyyy[,wwwwww,zzzzz] <CR>
Where:	nnnnn is the first port number mmmmm is the second port number xxxxx,yyyyy and wwwwww,zzzzz are additional port pairs
Command Example:	Make a single special low latency link from port 00010 to 02011 and another from port 02066 to 02013
SMSC sends:	LS,00010,02011/02066,02013 <CR>
DTSC response:	C/C<CR> <LF> \$
or	C/W,LS,02066,02013, PORTS LINKED USING ALTERNATE PATH , NON-SYMMETRICAL RESOURCES NOT AVAILABLE TO PROVIDE THIS PATH<CR> <LF> \$

2.15 OM (Operational Mode)

When in the operational mode, if the port was in the Error Message mode, an OM command issued to that port will cancel the Error Message mode.

Format:	OM <CR>
DTSC response:	C <CR> <LF> \$

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2.16 PF (Print off)

The Print off command will turn off the DTSC communications port output to the printer connected to the DTSC. This command will not effect communication output to the SMSC.

Format:	PF<CR>
DTSC response:	C<CR> <LF> \$

2.17 PN (Print on)

The Print on command will cause the DTSC communications port outputs (all error messages and command responses) to be sent to a printer connected to the DTSC as well as the SMSC. The messages will be sent to the printer independent of the EM port settings. If the printer is off-line when the command is executed, the DTSC will respond with a fail message. If the printer goes off-line during operation, a warning message will be sent to the EM port and messages will not be printed until the printer returns to on-line status. The printer being off-line will not affect communication output to the SMSC.

Format:	PN<CR>
DTSC response:	C<CR> <LF> \$ if printer ready is detected
or	F,PRINTER NOT READY<CR> <LF> \$ if printer is connected, but not ready
or	F,PRINTER NOT AVAILABLE<CR> <LF> \$ if printer is not connected

2.18 RS (ReSet)

The ReSet command or a Control Z (^Z) will reset one of the five RS232 communications ports. It will cancel the Error Message mode if active, establish the default communications settings on that port, abort any command in process, and clear the I/O on the DTSC-SMSC communication port. The new settings will take effect **after** the response.

Format:	RS[,n]<CR> reset specified RS232 port n or ^Z reset the current RS232 port
Command Example:	Reset RS232 port 3.
SMSC sends:	RS,3<CR>
DTSC response(s):	C <CR> <LF> \$
or	F,RS CANNOT RESET AN ETHERNET PORT<CR> <LF> \$

2.19 SC (Set Communications)

The Set Communications command will set the DTSC to SMSC communication settings for any of the five RS232 communication ports. When changing the communication parameters on your own terminal, the new settings in the DTSC will take effect **after** the response message for this command. If no parameters are entered, then the command becomes an inquiry and responds with the port number and settings.

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Format: SC[,n,bbbbbb,c,p,s,e,t]<CR>
Where: n = DTSC communication port (1-5) to set
bbbbbb = baud rate (see note for available rates)
c = character data set to bits (7 or 8)
p = parity set to (1 = odd, 2 = even, 3 = none)
s = stop bits (1, 2, 3 = none)
e = command echo (1 = on, 2 = off)
t = DTSC terminator sent (1 = <CR>, 2 = <CR> <LF>)

Note: The following baud rates are available – 120, 300, 600, 1200, 2400, 4800, 7200, 9600, 19200, 38400, and 57600.

Command Example: No parameters to display the current RS232 communication port setting.

SMSC sends: SC<CR>
DTSC response(s): C,n,bbbbbb,c,p,s,e,t<CR> <LF> \$
or F,SC NOT FUNCTIONAL FOR AN ETHERNET
PORT<CR> <LF> \$

Command Example: Set communications for port one between SMSC and DTSC, using 19200 baud, 7-character data set, even parity, one stop bit, command echo off, DTSC terminator <CR>.

SMSC sends: SC,1,19200,7,2,1,2,1<CR>
DTSC response(s): C<CR> <LF> \$
or F,SC CANNOT CHANGE AN ETHERNET PORT<CR> <LF> \$
or F,CANNOT INITIALIZE R232 DEVICE<CR> <LF> \$

2.20 VF (Verify path off)

The Verify path off command will turn off the verify path function. New paths will not be verified when the SMSC sends commands to link ports.

Format: VF<CR>
DTSC response: C<CR> <LF> \$

2.21 VN (Verify path on)

The Verify path on command turns on the verify path function. Each new path established by the DTSC is automatically verified when ports are linked, except for add on links made with the LM command. The mode will remain in effect until the DTSC receives a VF command to disable verify path. When verify path is on, if a link does not pass the verify, the link will be maintained in the database, but the resources will be marked as failed.

Format: VN<CR>
DTSC response: C<CR> <LF> \$

2.22 VP (Verify Path)

The Verify Path command will pass and verify data patterns between the two ports specified. Port numbers may be from 0 to the maximum port number. The verify function will not be attempted,

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and will be shown as failed, if the path was not linked prior to executing this command. The VP command performs the following:

1. Disable the drivers of ports to be verified (the external data stream will be interrupted).
2. Except for Broadcast links, send test patterns in both directions of the path and check that the test patterns are received correctly. Broadcast links will only be verified from inputs to output(s).
3. Report the result to the SMSC.
4. If the path verification is successful for both directions, enable the drivers of ports and resume normal operation.
5. If the path verification is unsuccessful in either direction, turn on the fault LED (red), turn off the active LED (green) and disable the drivers of both ports, record the failure in the database and resume normal operation.

Format: VP,nnnnn,mmmmm<CR>

Where: nnnnn = 1st port number
mmmmm = 2nd port number

Command Example: Verify Path command will verify the path between ports 02001 and 02050.

SMSC sends: VP,02001,02050<CR>

DTSC responses: C<CR> <LF> \$

or F,VP,02001,02001 TO 02050,VERIFY PATH ERROR
<CR> <LF> \$

or F,VP,02001,02050 TO 02001,VERIFY PATH ERROR
<CR> <LF> \$

or F,VP,02001,VERIFY PATH ERROR BOTH
DIRECTIONS<CR> <LF> \$

or F,VP,02001, 02001 AND 02050 NOT LINKED<CR> <LF> \$

or F,nnnnn, VERIFY PATH IS NOT SUPPORTED FOR ASTARTE

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3. Diagnostic Mode

Diagnostic Mode - (DTSC Communication Ports: RS232 1-5, Ethernet 1-4). This mode allows the users to access DTSC resources at the hardware level to perform diagnostics on the DTSC. The diagnostic tests can interrupt any background test in progress by requesting a resource being used by the background test. ***It cannot interrupt a link made in Operational Mode by stealing its resources. However, certain commands, IW (I2C Write), RW (Register Write), and SW (System Write), Sy (System Shutdown), can effect the operation of individual operational links and even the entire system.*** Therefore, a password is required when entering the Diagnostic Mode if the IW, RW, and SW commands are to be used. Otherwise, these commands are disabled. Obviously, these commands should be used with extreme caution if any part of the system is being used operationally. The Diagnostic Mode is invoked by any SMSC port from the Operational Mode using the DM command. Once in this mode, the SMSC is enabled on that port to issue any of the diagnostic mode commands as well as any of the operational commands. ***Any SMSC port being in Diagnostic Mode also enables the Server HUB keyboard and any of the Local Maintenance Terminals to sign on. Similarly, any SMSC port having used the password with the DM command enables the Server HUB keyboard and any of the Local Maintenance Terminals to use the three protected commands.*** The structure of the commands and responses in the Diagnostic Mode are identical to the Operational Mode, except that the prompt is changed to "*" if normal Diagnostic Mode, and "#" if the restricted commands are enabled. All outputs are formatted not to wrap using <CR> <LF>. When using the Local Maintenance Terminal (LMT), the following commands are not supported: DM (Diagnostic Mode), EM (Error Message), GM (Get Message), OM (Operational Mode), RS (ReSet), RT (Reset Terminal), and SC (Set Communications).

The Diagnostic Mode is terminated for an individual port when DTSC receives an OM command or Control Z (^Z) over that port. On return to the Operational Mode, DTSC will break all links created by this port during the diagnostic session, except those explicitly linked for extended diagnostic test. No other DTSC operating parameters will be changed, i.e., EM port designation, or RS232 communication port settings. When the last SMSC port returns to Operational Mode, all LMTs and the Server HUB Keyboard will be signed off and all of their links broken.

The commands available to an SMSC port in the Diagnostic Mode are all of the operational mode commands plus those listed in the following table. For limitations on commands available to the LMT, see Tables 2 and 5.

Table 5 – Diagnostic Mode Command List		
Command	Function	Comments
BD	Break Diagnostic	
DH	Display pathH	
FR	Display Failed Resources	
HS	Hot Swap	
IR	I2c Read	
IW	I2c Write	Only available if DM entered with password
LD	Link Diagnostic	

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Table 5 – Diagnostic Mode Command List		
Command	Function	Comments
OM	return to Operational Mode	Not available on the LMTs
RR	Register Read	
RT	Reset local maintenance Terminal	Not available on the LMTs
RW	Register Write	Only available if DM entered with password
SR	System function Read	
ST	Self Test	
SW	System function Write	Only available if DM entered with password
SY	System Shutdown	Only available if DM entered with password. Not available on the LMTs, and Server HUB Keyboard.

3.1 Linking and Breaking Connections in Diagnostic Mode

The port connection related commands supported under DM work in the same general manner as in the Operational Mode, with the following exceptions:

1. The Link Port, Link Many, Link Special, and Link Diagnostic will identify the resources usage as used in "Diagnostic Mode" and by which SMSC communication port or terminal. This allows all the diagnostic links for one terminal or SMSC communication port to be broken when a terminal or the Server HUB keyboard signs off or an SMSC communication port is returned to the Operational Mode. In addition, the "extended link" option will be accepted to link ports for extended tests. Ports linked with the "extended link" option will not be broken on sign off or return to Operational Mode. Under normal conditions, Link Diagnostic, Link Port, Link Many, and Link Special will not break ports linked in Operational Mode. However, Link Diagnostic can access resources previously used in Operational Mode, but marked 'failed'. Link Diagnostic is the only command that can utilize failed resources.
2. The "extended link" option is achieved by appending ",E" to the Link Port, Link Many, Link Special, or Link Diagnostic commands. The response messages for these commands are the same as for normal usage.
3. The Break Port, Break Range, and Break Diagnostic commands will break only those ports linked in the Diagnostic Mode by the terminal or SMSC communication port that issues the command. On the Local Maintenance Terminal, when using the menu, break range is limited to a range of one. If a port was linked as "Extended", then Break Port is the only command that will break the link while in the diagnostic mode.
4. Unless a resource is marked as Failed, Break Port, Break Range, Link Port, Link Many and Link Special from any Operational Mode communication port (RS232 or Ethernet) will break diagnostic links, including those linked under the "extended link" option.

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3.2 BD (Break Diagnostic)

The Break Diagnostic command breaks all paths made by this SMSC communication port or terminal during the current session, except for those that have been marked as extended. It may be issued by a local maintenance terminal, the Server HUB Keyboard, or an SMSC port operating in Diagnostic Mode. This function is automatically performed when a diagnostic terminal signs off or an SMSC port returns to Operational Mode.

Format:	BD<CR>
DTSC Response:	C<CR> <LF> *
or	W,BD,EXTENDED LINKS REMAIN: mmmmm,nnnnn/.../xxxxx, yyyyy<CR> <LF> *

3.3 DH (Display path)

The Display path command will display ports within the specified range that are currently linked. It displays what port they are linked to and all of the resources used to create the full duplex path. In the case of a Broadcast link, all members of the link are displayed. Only ports in the selected range will be queried. Display Path of 0 to 99999 will display the paths for all ports that are linked for either operational or diagnostic purposes. The paths of ports linked for background testing will not be displayed. On the Local Maintenance Terminal, due to the limited display area, only one path at a time may be requested. This information is retrieved from the Server HUB database.

Format:	DH,sssss,eeee<CR>
Where:	sssss = start range port number eeee = end range port number
General Response:	C[,linked path A/linked path B...../linked path X] <CR> <LF> *
	" linked path" is defined as follows:

If linked on Port Interface Card:nnnnn,mmmm,P

Where:	nnnnn is the first port number
	mmmmm is the second port number
	P indicates linked on the Port Interface Card

Note: In this case, it is implied that nnnnninput is linked to mmmmmOutput AND mmmmminput is linked to nnnnnOutput

If linked on Cage Router: nnnnn,mmmm,C

Where:	nnnnn is the first port number
	mmmmm is the second port number
	C indicates linked on the Cage Router

Note: Paths do not need to be specified as the Cage Router input and output channels are physically connected to the ports of the same number and as such, are not assignable.

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If linked on FOT/FOR only (non-symmetrical link):

Where: nnnnn,mmmmm,N,path1[-path2]
nnnnn is the first port number
mmmmm is the second port number
N indicates linked directly between FOT/FOR Routers
Path1 indicates the resources used to link nnnnn_{input} to
 mmmmm_{output}, in the form of X,"FOT channel
 number",R,"FOR channel number"
Path2 indicates the resources used to link nnnnn_{output} from
 mmmmm_{input}, in the form of R,"FOR channel
 number",X,"FOT channel number"

Note: if port nnnnn = mmmmm (loopback), there is no Path2.

If linked on FOM (via FOT/FOR) nnnnn,mmmmm,M | N,path1[-path2]

Where: nnnnn is the first port number
 mmmmm is the second port number
M indicates linked through FOM (Fiber Optic
 Multiplexer) using symmetrical resources
N indicates linked through a Fiber Optic Multiplexer
 using non-symmetrical resources
Path1 indicates the FOT/FOR Routers and Fiber Optic
 Multiplexer resources used to link nnnnn_{input} to
 mmmmm_{output}, in the form of X," FOT channel
 number", M,"FOM input channel number", "FOM
 output switch number",R,"FOR channel number"
Path2 indicates the FOT/FOR Routers and Fiber Optic
 Multiplexer resources used to link nnnnn_{output} from
 mmmmm_{input}, in the form of R,"FOR channel
 number", M, "FOM output switch number", "FOM
 input channel number", X,"FOT channel number".

Notes:

if port nnnnn = mmmmm (loopback), there is no Path2.

If linked in Packet Mode nnnnn,mmmmm,K
Where: nnnnn is the first port number
 mmmmm is the second port number
K indicates linked in Packet Mode

If linked in Broadcast Mode If a port specified in the DH range is in a Broadcast Mode chain, then the entire linked chain will be displayed. The path displayed for Broadcast Mode link is identical to the Display Linked (DL) command as described in section 2.4.

Command Example: Display paths of linked ports in the range of 02000 to 02033.

Where: 2000 and 2001 are linked on Port Interface Card; 2002 and 2048 are a non-symmetrical link via FOT/FOR Routers only; 2003 and 2006 are linked on the Cage Router; 2004 and 2049 are linked through a Fiber Optic Multiplexer; 2005 is linked to 01000 in Packet Mode; 2008 and 2010 are two

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ports in the Broadcast Mode chain (input port 00078, control port 00100, chain 00560, 01002, 02008, 02010); other ports in the range are not linked.

SMSC sends: DH,02000,02033<CR>
 DTSC reply: C,02000,02001,P/02002,02048,F,X,1984,R,2048-R,1984,X,2048,/02003,02006,C/02004,2049,M,X,1985,M,2080,1596,R,2049-R1985,M,1596,2080,X,2049/02005,01000,K/B,00078,00100,00560,01002,02008,02010<CR><LF>*

3.4 FR (display Failed Resources)

The display Failed Resources command will check the DTS configuration database for the state of the specified resource(s). Failed resource identification along with any additional failure information will be displayed.

Format: FR,type[,resource id]<CR>
 Where: type = resource type, as shown in the table below
 resource id = identification of the resource as shown in the table below, if omitted, all failed resources of the specified 'type' in the specified HUB will be displayed

Response(s): C,type[,resource id,state/.../resource id,state]<CR><LF>*
 or C,type,NO FAILED RESOURCES OF THIS TYPE<CR><LF>*
 or F,FR,type,resource id,NOT INSTALLED

Where: type and state are as defined in the table below

Note: If multiple failure states occur for one resource id, they will be listed as multiple states each separated by a ",".

Table 6 – Failed Resource Parameters

Type	Type Name	Resource id	State	Description
PI	Port Interface	0-4095	INT	Port failed for onboard paths
			CR	Port failed for Cage Router paths
			FOT/R	Port failed for FOT/FOR Router paths
			PKT	Port failed for Packet Mode paths
			DIFF	Power-On Discrepancy(port type or configuration)
CR	Cage Router	0-4095	FAIL	Cage Router channel failed
FOT	FOT Router	0-4095	FAIL	FOT Router channel failed
FOR	FOR Router	0-4095	FAIL	FOR Router channel failed
FOM	FOM Router	0-4095	FAIL	FOM Router channel failed

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Table 6 – Failed Resource Parameters

Type	Type Name	Resource id	State	Description
FOC	Fiber Optic cable / receiver	0-4095	FOR	Fiber Optic Transceiver on FOR did not detect light.
		0-4095	FOM	Fiber Optic Transceiver on FOM did not detect light
HUB	Client HUB	0-7	FAIL	Client HUB failed
HXB	HUB Extender Bridge	0-127	FAIL	HUB Extender Bridge failed
CXB	Cage Extender Bridge	0-127	FAIL	Cage Extender Bridge failed
IXB	Inter HUB EBM	0-23	FAIL	HUB/HUB Extender Bridge Pair failed
CRP	Cage Router Processor	0-127	FAIL	Cage Router Processor failed
FTP	FOT Router Processor	0-127	FAIL	FOT Router Processor failed
FRP	FOR Router Processor	0-127	FAIL	FOR Router Processor failed
FMP	FOM Router Processor	0-127	FAIL	FOM Router Processor failed
AST	Astarte Fiber Optic Switch	0-7	FAIL	Astarte Processor Failed.

3.5 HS (Hot Swap)

The Hot Swap command allows the user to perform on-power replacement of LRU's. The replacement LRU must be of the same type as the one removed. Substitution of LRU is not permitted. i.e., The user can not replace a parallel Port Interface Board with a serial Port Interface Board. The user can not insert a board which is not configured in the current configuration database.

The Hot Swap operation can only be performed on a per HUB basis, using a hand held "LMT (Local Maintenance Terminal)" connected to an extender bridge. This would allow Hot Swap of LRU's within the HUB which the LMT is connected to. However, this LMT can not initiate hot swap of resources in another HUB.

Refer to document "Local Maintenance Terminal : Operations Guide for the DTS" for the Hot Swap procedure. Hot Swap operation is accomplished via the 3 commands defined as follows:

Table 7 - Hot Swap Command Summary

Function	Command	Response Message	
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Table 7 - Hot Swap Command Summary

Function	Command	Response Message	
Remove Board	HS,R,cage#,slot#	C,HS,R,cage#,slot#, SET PWR SWITCH DWN. PUSH ACT. WHEN RDY ON, REMOVE BOARD.	The system has successfully completed: 1. validating the state of the requested resource 2. disabling active links on the requested resource and 3. updating the state of the requested resource The system is ready for user to remove the requested resource.
		F,HS,R,cage#,slot#, RESOURCE NOT INSTALLED IN DATABASE.	The system detected that the requested resource is not installed. Hot swap of not installed resource is not permitted.
		F,HS,cage#,slot#, RESOURCE ALREADY MARKED AS HOT-SWAPPED	The system detected that the requested resource is already being Hot Swapped.
		F,HS,cage#,slot#, LMT IN HOT SWAP RESOURCE PATH IS NOT PERMITTED.	The LRU specified is up-stream of where the LMT is connect. It is not possible to perform the Hot Swap since removal of LRU would break communication of LMT to the HUB.
Insert Board	HS,I,cage#,slot#	C,HS,I,cage#,slot#, OK TO ACTIVATE RESOURCE. <ENTER> TO INSTALL <ESC> TO ABORT	
		F,HS,I,cage#,slot#, RESOURCE NOT MARKED AS HOT-SWAPPED.	
Activate Board	HS,A,cage#,slot#	F,HS,A, cage#,slot#, INVALID OPERATION CODE	
		C,HS,A, cage#,slot#, INSERTION COMPLETE.	The requested resource was activated successfully. The resource passed power-on self tests as well as path verification of links using the requested resource. The database is updated to indicated resource is available for use, all links on the resource restored.
		F,HS,A, cage#,slot#, RESOURCE FAILED TO POWER UP.	The requested resource failed power-on self tests. The resource is still marked as in Hot Swap, links using this resource are not restored. The resource may be powered-off, removed and replaced with another one.

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Table 7 - Hot Swap Command Summary

Function	Command	Response Message	
		F,HS,A, cage#,slot#, INSERTION COMPLETE. VERIFY PATH FAILED	The requested resource was activated successfully. The resource passed power-on self tests but some links using the resource failed the path verification. The database is updated as follows: <ol style="list-style-type: none">1. resource available for use,2. links passed path verification are restored,3. links failed path verification are broken and the path is marked as failed.

Where:

cage# : The id of the cage within the HUB where the Hot Swap is to take place. Valid cage numbers are: 0-15 for PI cage, 16 for HUB cage and 17 for FOM cage.

Slot# : The slot in the specified PI cage where the resource is to be Hot Swapped. The validity of slot numbers are dependent on the cage type and are defined as follows:

- all cages : slot 0 for the entire cage
- PI Cages : slot 1 – for Cage to HUB Extender Bridge Module
slot 4,5,6,7,15,16,17,18 for Port Interface Board
slot 9 – FOT Router
slot 11- Cage Router
slot 13- FOR router
- HUB Cages : slots 2 to 16 for HUB to PI Cage Extender Bridge of cages 1 to 15
receptively (HUB EBM can not be hot swapped)
slot 17 to 19 for Inter-HUB Extender Bridge module
- FOM Cages : slots 1 to 16 for FOM 0 to 15

Linking and Breaking Ports while in Hot Swap

Breaking Port:

1. If the specified port is in Hot Swap and is linked to another port, the link will be broken.
2. if the specified port is not in Hot Swap, but is linked to a port which is in Hot Swap, then the link will be broken.

Linking Port:

If either port specified in the link port command is in Hot Swap or port linked to the specified port is in Hot Swap, then the following rules apply to the link port command:

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Table 8 – Link Port Rules for Hot Swap

Port1	Port2	Link Port Command Results
In Hot Swap	Don't care	No new link made. The old link(s) if exist, will not be affected.
Don't care	In Hot Swap	No new link made. The old link(s) if exist, will not be affected.
In Hot Swap	In Hot Swap	No new link made. The old link(s) if exist, will not be affected.
Linked to port in hot swap	Not in hot swap	Old link to Port1 is broken, old link to Port2, if exists, is broken. New link Port1 to Port2 is made.
Not in hot swap	Linked to port in hot swap	Old link to Port2 is broken, old link to Port1, if exists, is broken. New link Port1 to Port2 is made.
Linked to port in hot swap	Linked to port in hot swap	Old link to Port1 is broken. Old link to port2 is broken. New link port1 to port2 is made.

3.6 IR (I2c Read)

The I2C Read command allows the user to examine the devices on the I2C Bus. Table 9 lists the available commands and where each function is located.

Format: IR,fun,[H,hub,]mod< CR >
Where: fun = function to be examined
hub = HUB number (0-7)
mod = rack number (0-7 PI, 8 =HUB)
or cage number (0-15 PI, 16 =HUB)
or slot (1-21), as shown in Table 9.

Note: If H,hub is not entered, Client HUB 0 is assumed.

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DTSC Response:	r,fun,vvvv,u<CR><LF>*
Where:	"r" C indicates the read operation is successful F indicates the read operation failed "fun" is as defined above "vvvv" is the converted value (nominal shown above) "u" is the units associated with the value
Command Examples:	
SMSC sends:	IR,+5V,12<CR>
DTSC Response:	C,+5V,4.95,V<CR><LF>*
	Actual reading of 5 volt supply on the Extender Bridge (slot 1) of Port Interface cage 12 in "Client HUB 0".
SMSC sends:	IR,+5V,16<CR>
DTSC Response:	C,+5V,4.95,V<CR><LF>*
	Actual reading of 5 volt supply on the slot 1 Extender Bridge of the HUB cage in "Client HUB 0". (Cannot read these functions on the other Extender Bridges in the HUB cage, only slot 1)
SMSC sends:	IR,RPS,H,1,0<CR>
DTSC Response:	C,RPS,0.0,V<CR><LF>*
	Actual reading of the right hand "DC Power Supply OK" voltage from PI cage 0 in Client HUB 1. Value of 0.0 indicates the supply has failed or is turned off.
SMSC sends:	IR,RTN,2<CR>
DTSC Response:	C,RTN,50.0,C<CR><LF>*
	The rack temperature alarm turn on limit for Port Interface rack 2 in "Client HUB 0" is set at 50.0 °C
SMSC sends:	IR,FOMF,16<CR>
DTSC Response:	C,FOMF,255,Cnts<CR><LF>*
	Actual reading of the fan speed counter for the FOM cage in "Client HUB 0". Value of 255 count indicates no air flow.
SMSC sends:	IR,H,0,FOMS,16<CR>
DTSC Response:	C,FFFFFFF<CR><LF>*
	Status of the Fiber Optic Transceiver on the Fiber Optic Multiplexer in slot 16 of Client HUB 0 (channels 480-511). Indication is that channel 508 is not detecting light, the other 31 on this board are OK.

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Table 9 – I2C Read Functions

Fun	Mod	Value	Nominal / Tolerance	Location / Function
+5V	Cage #	v.vv V	5.00 ±0.25 V*	Extender Bridge / VCC
+5H	Cage #	v.vv V	5.25 V	Extender Bridge / VCC High Limit
+5L	Cage #	v.vv V	4.75 V	Extender Bridge / VCC Low Limit
+12V	Cage #	vv.v V	12.0 ±0.5 V	Extender Bridge / +12V
+12H	Cage #	vv.v V	12.5 V	Extender Bridge / +12V High Limit
+12L	Cage #	vv.v V	11.5 V	Extender Bridge / +12V Low Limit
-12V	Cage #	vv.v V	12.0 ±0.5 V	Extender Bridge / -12 V
-12H	Cage #	vv.v V	12.5 V	Extender Bridge / -12V High Limit
-12L	Cage #	vv.v V	11.5 V	Extender Bridge / -12V Low Limit
LPS	Cage #	v.vv V	3.00 ±0.2 V**	Left DC Power Supply / DC OK
LPSH	Cage #	v.vv V	3.25 V**	Left DC Power Supply / DC OK High Limit
LPSL	Cage #	v.vv V	2.75 V**	Left DC Power Supply / DC OK Low Limit
RPS	Cage #	v.vv V	3.00 ±0.2 V**	Right DC Power Supply / DC OK
RPSH	Cage #	v.vv V	3.25 V**	Right DC Power Supply / DC OK High Limit
RPSL	Cage #	v.vv V	2.75 V**	Right DC Power Supply / DC OK Low Limit
CTM	Cage #	vvv °C	35 °C	Extender Bridge / Cage Temperature
CTN	Cage #	vvv °C	50 °C	Extender Bridge / Cage Temp alarm ON
RTM	Rack #	vv.v °C	35.0 °C	Rack Fan / Rack Temperature
RTN	Rack #	vv.v °C	50.0 °C	Rack Fan / Rack Temperature alarm ON
LHF	Cage #	vvv Cnts	150 ±50 Cnts	Cage Fan Module / Status of Left Half Fan
LHFH	Cage #	vvv Cnts	200 Cnts	Cage Fan Module, Left Half High Limit
RHF	Cage #	vvv Cnts	150 ±50 Cnts	Cage Fan Module/ Status of Right Half Fan
RHFH	Cage #	vvv Cnts	200 Cnts	Cage Fan Module, Right Half High Limit
FOMF	Cage #	vvv Cnts	150 ±50 Cnts	FOM Fan Module/ Status of FOM Fan
FOMFH	Cage #	vvv Cnts	200 Cnts	FOM Fan Module, High Limit
FOMS	Slot #	hhhhhhhh	FFFFFFFF	FOM Fiber status, 0 = not detecting light
FORS	Cage #	hhhhhhhh	xxxxFFFF	FOR Fiber status, 0 = not detecting light
FOTS	Cage #	hhhhhhhh	xxxxFFFF	FOT Fiber status, 0 = not detecting light
ISR	Cage#	hhhh	FFFF	Contents of the System Monitor (LM78) interrupt status register. 1 = interrupt active, 0 = no interrupt
SMI	Cage#	hhhh	FFFF	Contents of the System Monitor (LM78) interrupt mask register. 1 = masked, 0 = unmasked
CFG	Cage#	hh	FF	Contents of the System Monitor (LM78) configuration register.

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* This voltage is read on the Extender Bridge Module, downstream of the Hot Swap circuitry. The voltage on the backplane and the power supplies is set to 5.15 V nominal to allow for the 0.15 V drop across the Hot Swap circuitry.

** The Left and Right hand DC power Supply readings and limits shown in the above table are applicable to PI Cages only. The following values are applicable to the HUB/FOM Cage.

Nominal Reading:	3.5V
High Limit (default):	3.8V
Low Limit (default):	3.4V

3.7 IW (I2c Write)

The I2C Write command allows the user to write to the modifiable values within the devices on the I2C Bus. Table 10 lists the available commands and where the function is located. Writing a new value to the device does not change the value defined in the configurable parameter file.

Warning – As with all diagnostic mode commands, writing to the devices on the I2C BUS can effect the entire system operation. These commands effect the limits that determine when alarms are issued, and as such could cause potential damage to the equipment due to an undetected fault. They should only be used by individuals thoroughly familiar with the details of the system alarm limits. As such, this command is only available if the “#” prompt is present indicating that the Diagnostic Mode was entered with the password.

Format:	IW,fun,[H,hub],mod,vvvv <CR>
Where:	fun = function to be modified
	hub = HUB number (0-7)
	mod = rack number (0-7 PI, 8 = HUB)
	or cage number (0-15 PI, 16 = HUB)
	or slot (1-21), as shown in Table 10.
	vvvv = value to be written

Note: If H,hub is not entered, Client HUB 0 will be assumed.

DTSC Response: C <CR> <LF> #

Command Example 1: Set the high alarm limit for the +5 volts on cage 10 of “Client HUB 0” to 5.25 volts

SMSC sends: IW, + 5H, 10, 5.25 <CR>

DTSC Response: C <CR> <LF> #

Command Example 2: Set the alarm turn on limit for the cage temperature on cage 13 of HUB 1 to 49 °C. (Granularity for cage temperature limits is 1°C).

SMSC sends: IW, H, 1, CTN, 13, 49 <CR>

DTSC Response: C <CR> <LF> #

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Command Example 3: Set the alarm turn on limit for the rack temperature on rack 8, HUB rack, of HUB 2 to 65.5 °C. (Granularity for rack temperature limits is 0.5°C).

SMSC sends: IW,RTN,H,2,8,65.5 <CR>

DTSC Response: C<CR> <LF> #

Command Example 4: Set PI Cage3, System Monitor Interrupt Mask bits 1 and 3 to 1 and unmask bits 5 and 7, all others unchanged. Original Mask = 0xFDA5.

SMSC sends: IW,SMI,3,00AA000A <CR>

DTSC Response: C,IW,SMI,3,FD0F <CR> <LF> #

Explanation :

Old contents	: 1111 1101 1010 0101	0xFDA5
Bits to change	: 0000 0000 1010 1010	0x00AA
New Bit Value	: 0000 0000 0000 1010	0x000A

Resultant value: 1111 1101 0000 1111 0xFD0F

Note : the high alarm limit can not be set to a value lower than the current low alarm limit; the low alarm limit can not be set to value higher than the current high alarm limit.

Table 10 – I2C Write Functions

Fun	Mod	Value	Default	Location / Function
+ 5H	Cage #	v.vv V	5.25 V	Extender Bridge / VCC High Limit, Max 5.5, Min 5.0
+ 5L	Cage #	v.vv V	4.75 V	Extender Bridge / VCC Low Limit, Max 5.0 Min 4.75
+ 12H	Cage #	vv.v V	12.5 V	Extender Bridge / + 12V High Limit, Max 13.0 Min 12.0
+ 12L	Cage #	vv.v V	11.5 V	Extender Bridge / + 12V Low Limit, Max 12.0 Min 11.0
- 12H	Cage #	vv.v V	12.5 V	Extender Bridge / - 12V High Limit, Max 13.0 Min 12.0
- 12L	Cage #	vv.v V	11.5 V	Extender Bridge / - 12V Low Limit, Max 12.0 Min 11.0
LPSH	Cage #	v.vv V	3.2 V**	Left DC PS/DC OK High Limit, Max 3.5, Min 3.0
LPSL	Cage #	v.vv V	2.8 V**	Left DC PS/DC OK Low Limit, Max 3.0, Min 2.5
RPSH	Cage #	v.vv V	3.2 V**	Right DC PS/DC OK High Limit, Max 3.5, Min 3.0
RPSL	Cage #	v.vv V	2.8 V**	Right DC PS/DC OK Low Limit, Max 3.0, Min 2.5
CTN	Cage #	vv.v °C	50.0 °C	Extender Bridge / Cage Temp alarm ON, Maximum 70.0
RTN	Rack #	vv.v °C	50.0 °C	Rack Temperature alarm ON, Maximum 70.0
LHFH	Cage #	vvv Cnts	200 Cnts	Cage Fan Module, Left Half High Limit, Maximum 254
RHFH	Cage #	vvv Cnts	200 Cnts	Cage Fan Module, Right Half High Limit, Maximum 254
FOMFH	Cage #	vvv Cnts	200 Cnts	FOM Fan Module, High Limit, Maximum 254
SMI	Cage#	hhhhhhh	bbbbffff	Set the System Monitor (LM78) interrupt mask. ddd : The left 4 digits define which bits to change, 1 = change, 0 = no change. fff : The right 4 digits define the new value of bits to be changed, 1 = mask, 0 = unmask.

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Table 10 – I2C Write Functions

Fun	Mod	Value	Default	Location / Function
CFG	Cage#	hh	0f	Set the System configuration register to operate the System Monitor (LM78) 0x08 – Stop Scanning 0x01- Start Scan 0x02-Enable interrupt

** Note: The Left and Right hand DC power Supply readings and limits shown in the above table are applicable to PI Cages only. The following values are applicable to the HUB/FOM Cage.

High Limit (default): 3.8V
High Limit (maximum): 4.0V
High Limit (minimum): 3.5V

Low Limit (default): 3.4V
Low Limit (maximum): 3.5V
Low Limit (minimum): 2.0V

3.8 LD (Link Diagnostic)

The Link Diagnostic command allows the user to link ports using specific resources. In addition to the normal restrictions to any command used in the Diagnostic Mode, the following additional restrictions and features are unique to this command:

1. If any specified resource is not available, no attempt will be made to seek an alternate path.
2. Packet mode links can be made between any two available ports which are not on the same PI card
3. Assuming resources are available, fiber links can be made between any two ports within one HUB
4. Cage router links can be made between any two ports within a rack.
5. The ports and switching resources may be specified **even if they are marked in the database as "failed"**.
6. Except for loopback, all paths created are duplex. The examples only show the simplex path from the first port to the second port, the return path is implied. For example, specifying an FOT channel for the first port also defines the FOR channel for the return path. Similarly, when the FOR is specified for the forward path, this defines the FOT for the return path. In other words, both halves of each Fiber Optic Transceiver will be used in a duplex path.
7. Loopback paths can be created by defining the first resource and the second resource as the same. This is the only form of a simplex path that can be created.
8. All resources are defined by their number in the range of 0-4095. As such, each resource is an individual entity. I.e., an FOT channel not an FOT Board. (It is not available for any of the Direct Fiber resources).
9. For symmetrical links, specifying FOM inputs is equivalent to specifying FOT channels and specifying FOM outputs is the same as specifying FOR channels. However, both commands are necessary to cover all of the different special links that are allowed for under the LS command.

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10. The optional parameter, E at the end of command specifies the link is an "extended test link" which is not to be broken when the terminal is signed off or returned to OM. In OM, the break port rules are applied to the extended test links. In DM, only a specified break port command from the same terminal that made the link can break the link, link port command does not automatically break an existing extended test link.

Format: LD,nnnnn,mmmmm,path[,E]

Where: nnnnn and mmmmm are the ports to be linked

path is defined as follows:

P = link on PI card.

K = link in the Packet Mode (except type D ports).

C = link using the Cage Router

M[param(s)] = link through FOT/FOM/FOR with or without specifying the Fiber Optic Multiplexer.

X[param(s)] = link through a fiber path using a specified FOT and / or FOR. If the path is symmetrical, the FOM resource is defined by the FOT and FOR selected.

NS,param(s) = link through a non-symmetrical fiber path using specified non-symmetrical resources which may be : (1) FOT/FOR, (2) FOT/FOM/FOR or (3) FOT/FOM/FOM/FOR. All resources must be specified and defined as "non-symmetrical" resources in the configuration database. If the specified resources are not available or not non-symmetrical, no links will be made.

E specifies that the link is to be made in the "extended test mode"

Notes: The parameter options of each path type are defined in Table 11 below.

Table 12 provides some examples of the command syntax.

Table 13 provides a list of the response messages unique to these commands.

Table 11 – Path and Parameter Definition

Path Type	Description	Parameters	Value	Action
P	Link on PI card	None	None	Link is made on PI card provided both ports are on the same PI card.
K	Link in Packet Mode	None	None	Link in Packet Mode provided both ports are not on same PI card and not Type D ports.
C	Link on Cage Router	None	None	Ports are linked on the Cage Router provided both ports are in the same Port Interface Rack.
M	Link on FOT/FOM/FOR	None	None	Link using fiber paths, Software selects all resources using the same algorithm as the LP command.

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Table 11 – Path and Parameter Definition

Path Type	Description	Parameters	Value	Action
	Link on FOT/FOM/FOR through specified FOM.	FOM Spec	N,# I,# O,# B,#,#	N - # is the FOM number I - # is the FOM input channel number O - # is the FOM output channel number B - 1 st # is the FOM input, 2 nd # is FOM output
		FOM Number	0-127	The software will select the most appropriate input and output on the specified FOM, which defines the FOT and FOR.
		FOM Input Number	0-4095	Software will assign the specified input to the most appropriate output, which defines the FOR.
		FOM Output Number	0-4095	Software will select the most appropriate input and assign it to the specified output, which defines the FOT.
		FOM Input and Output number	0-4095	Software will assign the specified input to the specified output. The input and output number must be within the same FOM.
X	Link on FOT/[FOM]/FOR through specified FOT/FOR pair(s)	FOT/FOR Spec	F,# S,# B,#,#	F - # is the FOT/FOR channel for the first port S - # is the FOT/FOR channel for the second port B - 1 st # is FOT/FOR for 1 st port, 2 nd # is FOT/FOR for 2 nd port
		1 st port FOT/FOR channel	0-4095	Software will find the destination device input of the specified FOT output and if a FOM, select an available FOT/FOR. Pair for the 2 nd port.
		2 nd port FOT/FOR channel	0-4095	Software will find the destination device input of the specified FOT output and if a FOM, select an available FOT/FOR. Pair for the 1 st port.
		FOT channel and FOR channel	0-4095	If the FOT/FOR pairs specified are connected to a FOM, software will make the connection through the FOM.
NS	Link on fiber path through specified non-symmetrical resources	FOT/FOR Spec	f,#1,#2	#1 is FOT channel for 1 st port, #2 is FOR channel for 2 nd port. The specified FOT, FOR must be connected directly.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 11 – Path and Parameter Definition

Path Type	Description	Parameters	Value	Action
	All non-symmetrical resources must be explicitly specified, otherwise, link will not be made.	FOT/FOM/FOR Spec	m1,#1, #2	#1 specifies the input of the first FOM channel, #2 specifies output channel of the second FOM channel. The non-symmetrical FOT/FOR connected to the specified FOMs will be used. FOM channel #1 and #2 are on the same FOM Board.
		FOM/FOM Spec	m2,#1, #2	#1 – first FOM output channel number #2 – second FOM input channel number FOM #1 and #2 are on different HUBs. The system will first use non-symmetrical FOT/FOR to FOM connections for each FOM specified. If non-available, use symmetrical resources
		FOT/FOM/FOM/FOR Spec	m3,#1, #2,#3, #4	#1 – first FOM input channel number #2 – second FOM output channel number #3 – third FOM input channel number #4 – fourth FOM output channel Note 1 : The second and the third FOM must be connected together. Note 2 : FOT and FOR channels used are those connected to FOM channels specified by #1 and #4. Note 3 : FOM channels #1 and #2 are on the same FOM Board, FOM channels #3 and #4 are on the same FOM Board, different from #1 and #2.

Table 12 – LD Command Examples

No.	Command	Description of Link	Remarks
1.	LD,0,3,K	Links ports 0 and 3 in Packet Mode	Fail, Can't link ports on same PI card in Packet mode.
2.	LD,0,31,K	Links ports 0 and 31 in Packet Mode (ports can not be type D).	LP command would link these two ports on Cage Router.
3.	LD,0,3,C	Links ports 0 and 3 on the Cage Router with inputs and outputs associated to ports 0 and 3.	LP command would link these two ports on the PIB.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 12 – LD Command Examples

No.	Command	Description of Link	Remarks
4.	LD,0,3,M	Link ports 0 and 3 through FOT/FOM/FOR. The system selects all resources required.	LP command would link these two ports on the PIB.
5.	LD,0,23,M,N,15	Link ports 0 and 23 through FOM 15. The system selects an available FOT for port 0 which is connected to FOM 15 and an available FOR for port 23 which is connected to FOM 15.	LP command would link these two ports with the Cage Router.
6.	LD,0,95,M,N,15	Link ports 0 and 95 through FOM 15. The system selects an available FOT for port 0 which is connected to FOM 15 and an available FOR for port 95 which is connected to FOM 15.	LP command would link these two ports through FOT/FOM/FOR, selecting the first unused FOT and FOR which are connected to the same FOM.
7.	LD,0,23,M,I,225	Link port 0 and 23 through the FOM input channel 225 (2 nd input on FOM 7). FOM input must be connected to an FOT available to port 0. The input will be assigned to an available output (FOR) on FOM 7 that can be connected to port 23.	LP command would link these two ports with the Cage Router.
8.	LD,0,23,M,O,223	Link port 0 and 23 through the FOM output 223 (last input on FOM 6). FOM output must be connected to a FOR available to port 23. An available input (FOT) on FOM 6 that can be connected to port 0 will be assigned.	LP command would link these two ports with the Cage Router.
9.	LD,0,23,M,B,16,17	Link port 0 and 23 through the FOM input 16 and output 17. The FOM input must be connected to an FOT available to port 0. The FOM output must be connected to a FOR available to port 23. The specified FOM input and output must be on the same FOM.	LP command would link these two ports with the Cage Router.
10.	LD,0,95,X,F,23	Link port 0 to 95 through FOT output 23 on port 0's FOT. The system searches the FOM connected to FOT output 23 for an available output to connect to the FOR of port 95.	LP command would link these two ports through FOT/FOM/FOR, selecting the first unused FOT and FOR which are connected to the same FOM.
11.	LD,0,95,X,S,10	Link port 0 to 95 through FOT output 74 on port 95's FOT. The system searches the FOM connected to FOT output 74 for an available FOT/FOR for port 0.	LP command would link these two ports through FOT/FOM/FOT, selecting the first FOT/FOR pairs available to each port, which are connected to the same FOM.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 12 – LD Command Examples

No.	Command	Description of Link	Remarks
12.	LD,0,95,X,B,23,103	Link port 0 to 95 through FOT/FOR pair 23 for port 0 and FOT/FOR pair 103 for port 95. Selection of two FOT/FOR pairs which are not on the same FOM will result in an error and no connections	LP command would link these two ports through FOT/FOM/FOT, selecting the first FOT/FOR pairs available to each port, which are connected to the same FOM.
13.	LD,0,95,NS,F,23,65	Link port 0 to 95 through FOT/FOR pair 23 for port 0 and FOT/FOR pair 65 for port 95.	FOT channel 23 FOR channel 65 are directly connected physically as well as configured in the database.
14.	LD,0,540,NS,M1,35,57	Link port 0 to 540 through non-symmetrical FOT/FOM/FOR resources, FOM channels 35 and 57.	FOM channel 35 is connected non-symmetrically to FOT/FOR in port 0 cage. FOM channel 57 is connected non-symmetrically to FOT/FOR in port 540 cage(in HUB 1).
15.	LD,0,540,NS,M2,23,650	Link port 0 to 540 through FOT/FOR pair (in HUB 0, cage 0) connected non-symmetrically to FOM channel 23 and FOM channel 650 connected non-symmetrically to FOT/FOR in HUB 1, cage 0.	FOM channel 23 (HUB 0, FOM board 0) is connect directly FOM channel 650 (HUB 1,FOM board 4). The system will search each FOM board for symmetrical FOM connection to FOT/FOR for port 0 and 540 respectively.
16.	LD,0,540,NS,M3,35,63,537,540	Link port 0 to 540 through FOT/FOR (for port 0) connected non-symmetrically to FOM channel 35, FOM channel 63 which is connected non-symmetrically to FOM 537 (in HUB 1), then select FOM 540 which is connected non-symmetrically to FOT/FOR pair in HUB 1 cage 0 (for port 540)	FOM channel 63 in HUB 0 is connected directly to FOM channel 537 in HUB 1. FOM channel 35 in HUB 0, FOM board 1 is connected non-symmetrically to FOT/FOR in HUB 0 Cage 0. FOM channel 540 in HUB 1, FOM board 0 is connected non-symmetrically to FOT/FOR in HUB 1 Cage 0.

Table 13 – Command Response Messages Unique to LD

No.	Condition	Response Message
1.	Ports linked using the resources specified. Result: Specified ports are linked.	C<CR><LF>*
2.	Invalid Path Type parameter Result: Specified ports are not linked.	F,LD,nnnnn, UNRECOGNIZED PATH TYPE, <i>type</i> <CR><LF>*
3.	Attempt to link type D ports in Packet Mode.	F,cc,nnnnn,CAN NOT LINK TYPE D PORTS IN PACKET MODE.

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Table 13 – Command Response Messages Unique to LD

No.	Condition	Response Message
4.	Specified path type is not compatible with the ports specified. i.e. LD,0,95,C specifies linking port in Cage 0 with port in Cage 2 on cage router which is physically impossible. Result: Specified ports are not linked.	F,LD,nnnnn, PORTS nnnnn AND mmmmm CANNOT BE CONNECTED WITH THE SELECTED PATH TYPE, <i>type</i> <CR> <LF> *
5.	Specified resources not connectable; PIC CR FOM FOM Result: Specified ports are not linked.	F,LD,nnnnn, PORTS nnnnn AND mmmmm NOT ON SAME PI CARD <CR> <LF> * F,LD,nnnnn, PORTS nnnnn AND mmmmm NOT IN SAME RACK <CR> <LF> * F,LD,nnnnn, FOT/FOR <i>id1</i> AND FOT/FOR <i>id2</i> NOT CONNECTED TO SAME FOM <CR> <LF> * F,LD,nnnnn, FOM INPUT <i>input</i> AND FOM OUTPUT <i>output</i> ARE NOT ON SAME FOM <CR> <LF> *
6.	Specified resource and port mismatch, i.e., LD,0,99,X,F,72 which specifies link port 0,99 using FOT 72. Port 0 in cage 0 cannot access FOT 72 in cage 2. Result: Specified ports are not linked.	F,LD,nnnnn, PORTS nnnnn AND mmmmm, <i>resource, id [resource, id,...]</i> CANNOT BE CONNECTED WITH THE SELECTED RESOURCES <CR> <LF> * The definition of " <i>resource(s)</i> " and " <i>id</i> " is the same as in (6).
7.	Any of the specified resources not installed Result: Specified ports are not linked.	F,LD,nnnnn, <i>resource, id</i> NOT INSTALLED <CR> <LF> * Where <i>resource(s)</i> may be combination of: PIC : Port Interface Card CR : Cage Router FOT : Fiber Optic Transmitter FOR : Fiber Optic Transmitter FOM : Fiber Optic Multiplexer <i>id</i> is the identification number of the specified resource.
8.	Any of the specified resource(s) is being hot swapped. Result: Specified ports are not linked.	F,LD,nnnnn, <i>resources,id [resource,id,...]</i> BEING HOT SWAPPED <CR> <LF> * The definition of " <i>resource(s)</i> " and " <i>id</i> " is the same as in (6).
9.	Ports are linked in OM mode. Result: Specified ports are not linked.	F,LD,nnnnn,[mmmmm],CANNOT BREAK OPERATIONAL MODE LINK <CR> <LF> * nnnnn,[mmmmm] will identify Port(s) not available
10.	Specific resource <i>id</i> is specified in the command <u>and</u> any of the specified resource(s) is(are) used in OM Result: Specified ports are not linked.	F,LD,nnnnn, <i>resource(s) id</i> LINKED IN OPERATIONAL MODE <CR> <LF> * The definition of " <i>resource(s)</i> " and " <i>id</i> " is the same as in (6).
11.	Ports are linked in DM, but by another terminal Result: Specified ports are not linked.	F,LD,nnnnn,[mmmmm],CANNOT BREAK A DIAGNOSTIC LINK MADE BY ANOTHER TERMINAL <CR> <LF> *

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Table 13 – Command Response Messages Unique to LD

No.	Condition	Response Message
12.	Specific resource id is specified in the command and any of the specified resource(s) is(are) used in DM by another terminal Result: Specified ports are not linked.	F,LD,nnnnn, <i>resource(s) id</i> LINKED IN DIAGNOSTIC MODE BY ANOTHER TERMINAL<CR> <LF> * The definition of " <i>resource(s)</i> " and " <i>id</i> " is the same as in (6).
13.	Any of the specified resource(s) is being used by another link. Result: Specified ports are not linked.	F,LD,nnnnn, <i>resource id, [resource,id,...,]</i> IN USE<CR> <LF> * The definition of " <i>resource(s)</i> " and " <i>id</i> " is the same as in (6).

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3.9 OM (Operational Mode)

When an SMSC port is in Diagnostic Mode, an OM command issued from the port will return that SMSC port to Operational Mode. If the port was also in Error Message mode, this will not be effected. The DTSC will break all links created by this SMSC port while operating in the diagnostic mode, except those linked for extended test. When all SMSC ports are returned to Operational Mode, any Local Maintenance Terminals and the Server HUB keyboard will be signed off. Any remaining links made in the diagnostic mode will be broken at this time unless they were made as extended links.

Format:	OM<CR>
DTSC response:	C<CR><LF>\$
or	W,OM,EXTENDED LINKS REMAIN: mmmmm,nnnnn/.../xxxxx,yyyyy<CR><LF>\$

3.10 RR (Register Read)

The Register Read command allows the user to examine the contents of the 32 registers on each PI card as HEX data. Twenty-four of those registers are associated with individual ports (six each on the four ports). The other eight registers are common to all four ports on any one PI card.

Format:	RR,nnnnn,reg<CR>
Where:	nnnnn = port number reg = register to be examined, see following list
DTSC Response:	C,reg,dddd<CR><LF>*
Where:	reg = register being examined, as defined in following list dddd = is HEX data, see bit definitions in following list

The basic definition of each register is shown in the table below. For more information on the specific bits in each register, see the programming interface specification for the PI card being examined (serial or parallel). Bits not specified are not implemented.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 14 – Port Interface Registers, Bit Definitions

Register	Bits	Unique to	Par / Ser Both	Function
SSR		Port		Source select register
	Data[13]		Both	Reset Fibre Channel State Machine (0 = off, 1 = reset)
	Data[12]		Parallel	Force Fibre Channel Sync. 0 = Normal, 1 = Force
	Data[11]		Both	Port Active (Green) LED (1 = ON)
	Data[10]		Parallel	NTDS Type (1 = A, 0 = B)
	Data[10]		Serial	NTDS Type (1 = E, 0 = D)
	Data[9]		Both	Port Status (Red) LED (1 = ON)
	Data[8]		Both	Fibre Channel Path (1 = Cage, 0 = FOT/FOR)
	Data[7]		Both	Output Enable for Fibre Channel
	Data[6]		Both	Enable Packet Out Mode
	Data[5]		Both	Output Enable for Output Source Select
	Data[4:3]		Both	Fibre Cannel/Packet Output Source Select 00 = Self, 01 = Received Fibre Channel, 10 = Received Packet, 11 = Diagnostic
	Data[2:0]		Both	Port Output Source Select 000 = Base + 0, 001 = Base + 1, 010 = Base + 2, 011 = Base + 3, 100 = Recd. Fibre Channel, 101 = Recd. Packet, 110 = Rsvd., 111 = Diag.
PMCF		Port	Parallel	Packet mode slave configuration (see special format in the RW section for writing to this register)
	Data[7]			Primary Slave Port
	Data[6]			Participating Slave Port
	Data[5:0]			Receive Broadcast ID
PMA		Port	Both	Packet mode master address
	Data[31:0]			Packet Mode VME Destination Address
FCI		Port	Both	Fibre channel received ID (Read Only)
	Data[31:12]			Zero
	Data[11:0]			Source Port ID of data received over Fibre channel
PMCT		Port		Packet mode slave control (Write Only)
	Data[15]		Parallel	EFR
	Data[14]			EIR
	Data[13]			IDR
	Data[12]			ODR
	Data[19]		Serial	A Select (Route data to A side of port)
	Data[12:10]			Bits from a control frame if bit 3 set
	Data[9:4]			Number of valid bits in the data stream (1-35)
	Data[3]			Control Flag, indicates a control frame

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Table 14 – Port Interface Registers, Bit Definitions

Register	Bits	Unique to	Par / Ser Both	Function
	Data[2]			Sync bit
	Data[1]			Word Information bit
	Data[0]			Parity bit
PMD		Port	Both	Packet mode slave data (Write Only)
	Data[31:0]			NTDS data to be placed on output port
GCR		Card		General configuration register
	Data[31]		Serial	Board soft reset
	Data[24:16]			Individual State Machine resets (3A through 0B)
	Data[7]			Enable VME BusHog mode
	Data[6:5]		Both	Diagnostic Mode port select
	Data[4]		Serial	Selects A/B half of serial port for diagnostic read
	Data[3:0]		Both	VME Interrupt Mask Bits
ISR		Card		Interrupt status register
	Data[31:24]		Serial	Port Interrupt Status (Parerr / Rxerr for ports 3:0)
	Data[23:16]			Port Interrupt Status (Framing error, ports 3B:0A)
	Data[15:8]			Port Interrupt Status (Protocol error, ports 3B:0A)
	Data[11:8]		Parallel	Port Interrupt Status (Fault, ports 3:0)
	Data[4:0]		Both	VME Backplane Slot ID
DCI		Card		Diagnostic control input
	Data[3:0]		Parallel	EFR, EIR, IDR, ODR
	Data[3:0]		Serial	Control Frame bits
DDI		Card	Both	Diagnostic data input
	Data[31:0]			Data Frame or Data Word
DCO		Card	Both	Diagnostic control output (Read Only)
	Data[3:0]			See DCI
DDO		Card	Both	Diagnostic data output (Read Only)
	Data[31:0]			Data Frame or Data Word
PHR		Card	Both	Packet header register
	Data[11:9]			HUB ID
	Data[8:5]			Cage ID
	Data[4:0]			Port ID
IDR		Card	Both	Identification register (Read Only)
	Data[7:4]			Board type (0 = quad serial, 1 = quad parallel)
	Data[3:0]			Revision level

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3.11 RT (Reset Terminal)

The Reset Terminal command allows an SMSC port or the Server HUB keyboard to reset a Local Maintenance Terminal which is no longer responding to user input. The terminal to be reset is identified by the cage and slot number of the Extender Bridge that it is plugged into.

Format:	RT,cage#[,slot#]<CR>
Where:	cage# = number of cage where LMT is plugged in (0-15 for PI cages, 16 for HUB cage) slot# = slot of Extender Bridge in HUB cage where LMT is plugged in (1-19).
DTSC Responses	C<CR><LF>*
or	F,RT,LMT,cage#[,slot#] NOT CURRENTLY SIGNED ON <CR><LF>*

3.12 RW (Register Write)

The Register Write command allows the user to modify the contents of any of the 32 registers on each PI card. Twenty-four of those registers are associated with individual ports (six each on the four ports). The other eight registers are common to all four ports on any one PI card. The values for "reg" and bit definitions are shown in Table 14. For more information on the specific bits in each register, see the programming interface specification for the PI card being examined (serial or parallel).

Warning – As is potential with all diagnostic mode commands, writing to the registers in the PI cards can effect the entire system operation. These commands should be used with extreme caution. They should only be used by an individual thoroughly familiar with the details of the PI card operation. As such, this command is only available if the “#” prompt is present indicating that the Diagnostic Mode was entered with the password.

Format:	RW,nnnnn,reg,vvvv<CR>
Where:	nnnnn = port number reg = register to be written vvvv = HEX value to be written
DTSC Response:	C<CR><LF>#

The following is a special case of the Packet Mode Slave Configuration Register write. This is only used to manually change the Cage Responder of members in the Broadcast Link.

Format:	RW,nnnnn,PMCF,aabbxxyy<CR>
Where:	nnnnn = port number PMCF = Packet Mode Slave Configuration Register aabbxxyy = HEX value to be written to the PMCF

The definition and usage of “aa”, “bb” and “yy” is as follows:

if either “aa” or “bb” is non-zero, then

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"aa" is the current VME respondent port in the cage where "aa" modulus 32 of current respondent port number
"bb" is the new VME respondent port in the cage where "bb" is modulus 32 of nnnnn
"yy" is ignored

if both "aa" and "bb" are zero, then

"yy" is the value to be written to the PMCF
"aa" and "bb" are ignored
"xx" is not used in all cases.

DTSC Response: C<CR> <LF> #

Example: The following example changes the current VME respondent of a broadcast link in PI cage 9 from port 293 to port 307.

rw,307,pmcf,05130000

05 (Hex) is modulus 32 of port 293 – old VME respondent
13 (Hex) is modulus 32 of port 307 – new VME respondent

NOTE: The format of "aabbxxyy" is necessary to minimize the presence of more than one VME respondent in a PI cage for the same broadcast when changing the present respondent (i.e., hot swap of a PI Board which is the VME respondent for a broadcast link). Presence of more than one respondent can cause failure in the data transfer.

3.13 SR (System function Read)

The System function Read provides the ability to read the various system functions identified below.

Format: SR,fun,[H,hub,][mod1[,mod2][,mod3]<CR>
Where: fun = function to be operated on
H,hub = HUB number (0-7)
mod1 = rack #, cage #, or sub-function as shown in Table 15
mod2 = sub address, etc.
mod3 = sub function

Note: If H,hub is not entered, Client HUB 0 will be assumed.

DTSC Responses: C,fun,[H,hub,][mod1,][mod2,][mod3,]vvvv,u<CR> <LF> *
or F,SR,fun, UNABLE TO GET INFO FROM SYSTEM
<CR> <LF> *

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Notes:

1. The function PWR reads the actual outlet ON/OFF status of the AC power controller in the specified rack. The AC power controller outlet assignments are shown in Appendix A.
2. All of the sub-functions within the CFG function (Mod 1) are read from the Config.txt file. If the sub-function (configurable parameter) specified is not defined in the Config.txt, the default value is displayed. The Value/Status shown in table below are example only.
3. All of the DB sub-functions are read directly from the database.

Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
PWR	Rack #	Outlet #	-	ON / OFF	AC Power on/off in each rack
HBV	-	-	-	Software Name, Version and date	HUB Application Software Version & date. If the optional parameter for the HUB number is omitted, then the Server HUB software name, version and date is returned. If the HUB number is specified, then the specified Client HUB software name, version and date is returned.
CFG	DBN	-		Name, date	DataBase Name and date
	ENT	Port #	a	IP Address	Ethernet port address for logical "Port #"
			e	Command Echo	1 = echo, 2 = no echo
			t	Response Terminator	1 = <CR>, 2 = <CR> <LF>
	ETO	Port #	-	Timeout	Ethernet network timeout
	PDD	-	-	Delay	Power off Delay from rack or cage alarm
	VALM	-	-	RATE	Voltage alarm message repeat rate in seconds
	POST	-	-	Full/Part	Enable Full Power On Self Test
	CPP	Port #	d,	Device	RS232 Comport assigned device (1 = Mouse, 2 = AC Control, 3 = Astarte, 4 = SMSC port)
			b,	Baud rate	120,300,600,1200,2400,4800,7200,9600,19200,38400,57600
			c,	Data bits	7 or 8
			p,	Parity	1 = odd, 2 = even, 3 = none
			s,	Stop bits	1, 2, 3 = none
			e,	Command Echo	Device = SMSC only 1 = echo, 2 = no echo
			t,	Response Terminator	Device = SMSC only: 1 = <CR>, 2 = <CR> <LF>
	+ 5H	Cage #	-	5.25V	VCC High Limit, nominal value shown

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Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
	+ 5L	Cage #	-	4.75V	VCC Low Limit, nominal value shown
	+ 5Y	Cage #	-	0.05V	VCC Hysteresis, nominal value shown
	+ 12H	Cage #	-	12.5V	+ 12V High Limit, nominal value shown
	+ 12L	Cage #	-	11.5V	+ 12V High Low, nominal value shown
	+ 12Y	Cage #	-	0.05V	+ 12V Hysteresis, nominal value shown
	-12H	Cage #	-	12.5V	-12V High Limit, nominal value shown
	-12L	Cage #	-	11.5V	-12V Low Limit, nominal value shown
	-12Y	Cage #	-	0.05v	-12V Hysteresis, nominal value shown
	LPSH	Cage #	-	3.25V**	Left DC Power Supply DC OK High Limit
	LPSL	Cage #	-	2.75V**	Left DC Power Supply DC OK Low Limit
	LPSY	Cage #	-	0.05V	Left DC Power Supply DC OK Hysteresis
	RPSH	Cage #	-	3.25V**	Right DC Power Supply DC OK High Limit
	RPSL	Cage #	-	2.75V**	Right DC Power Supply DC OK Low Limit
	RPSY	Cage #	-	0.05V	Right DC Power Supply DC OK Hysteresis
	CTN	Cage #	-	50 °C	Cage Temperature alarm ON default
	CTY	Cage #	-	5 °C	Cage Temperature alarm Hysteresis
	RTN	Rack #	-	50 °C	Rack Temperature alarm ON default
	RTY	Rack #	-	5 °C	Rack Temperature alarm Hysteresis
	LHFH	Cage #	-	200 Cnts	Cage Fan Module, Left Half Fail Limit
	LHFY	Cage #	-	10 Cnts	Cage Fan Module, Left Half Fail Hysteresis
	RHFH	Cage #	-	200 Cnts	Cage Fan Module, Right Half Fail Limit
	RHFY	Cage #	-	10 Cnts	Cage Fan Module, Right Half Fail Hysteresis
	FOMFH	Cage #	-	200 Cnts	FOM Fan Module, Fail Limit
	FOMFY	Cage #	-	10 Cnts	FOM Fan Module, Fail Hysteresis
DB	PORT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				PIC	121, On card links failed
				CRT	122, Cage Router links failed
				FOT	124, FOT/FOR Router links failed
				PKT	128, Packet mode failed
				ALL	12F, All modes failed
				DIFF	140, Discrepancy detected at Power-On
	CRT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed

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Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				LBK	121, Channel failed power-on loopback
				CFG	140, Failed to configure at Power-on
	FOT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	FOM	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	FOR	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	HUB	HUB #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Client HUB failed
				OFF	12F, Client HUB has been powered off
				DIFF	140, Discrepancy detected at Power-On
	HXB	HUB EBM #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, HUB EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected

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Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
	CXB	Cage HUB #	-	OFF	12F, The entire HUB Cage has been powered off. All HXBs in this HUB should show status of 12F
				SUM	124, FLASH Checksum Error
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Cage EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected
				SUM	124, FLASH Checksum Error
				OFF	12F, The Entire Cage has been powered off
	IXB	Inter-HUB EBM #	-	DIFF	140, Discrepancy detected at Power-On
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				OFF	12F, The entire HUB Cage has been powered off. All IXBs in this HUB should show status of 12F
				FAIL	120, Inter-HUB EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected
				SUM	124, FLASH Checksum Error
				DIFF	140, Discrepancy detected at Power-On
	CRP	Cage Router #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				TOUT	121, Cage Router Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
	FTP	FOT Router #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				TOUT	121, FOT Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error

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Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-On
	FRP	FOR Router #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				TOUT	121, FOR Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-On
	FMP	FOM Router #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				TOUT	121, FOM Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-On
	AST	Astarte #		AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				FAIL	120, Failed communication or Power on self test
				DIFF	140, Discrepancy detected at Power-On
	CFT	Resource1	[Resource2]	See notes and examples at the end of table	
	CFR	Resource1	[Resource2]	See notes and examples at the end of table	
	CFM	Resource1	[Resource2]	See notes and examples at the end of table	
VIF	HUB	SCR	Slot #	32 bit data	HUB EBM Status/Command Register
		VBR	Slot #	32 bit data	HUB EBM VME Memory Base Register
		BID	Slot #	32 bit data	HUB EBM VME Receive Broadcast ID Register
		PSR	Slot #	32 bit data	VME Primary Slave Register for Broadcast
	PI	SCR	Cage #	32 bit data	Cage EBM Status/Command Register
		VBR	Cage #	32 bit data	Cage EBM VME Memory Base Register
		BID	Cage #	32 bit data	Cage EBM VME Receive Broadcast ID Register
XLAT	HUB	Slot #	Page #	32-bit ADD	Translation Tables in HUB Extender Bridge
	PI	Cage #	Page #	32-bit ADD	Translation Tables in PI Extender Bridge

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Table 15 – System Functions, Read

Fun	Mod 1	Mod 2	Mod 3	Value / Status	Function / Location
ROUTER	Cage #				Displays the "upper/lower" switch selection of the routers in the specified cage in the format of: xyz where: x: FOR selection, 0-lower half, 1-upper half y: FOT selection 0-lower half, 1-upper half z: Cage Router selection 0-lower half, 1-upper half
TIME				Date & Time	Displays the current date and time in the following format: mm-dd-yy hh:mm:ss
NV	Type	Channel1	[Channel2]		Display the contents of NVRAM for the channels of the specified router type. If only Channel1 is specified, then only the specified channel is displayed. If both Channel1 and Channel2 are specified, then all channels between Channel1 and Channel2 inclusive are displayed. Type may be one of the following: CRT: Cage Router FOT: Fiber Optic Transmitter FOR: Fiber Optic Receiver FOM: Fiber Optic Multiplexer

** see notes in the "Configuration File" section for details of the limits specific to the HUB Cage power supply monitoring.

Notes on: SR,DB,CFT and SR,DB,CFR and SR,DB,CFM

All these 3 commands display the as-configured connection between FOT/R and FOM.

Resource 2 is optional. If specified, the connection of resource 1 through to resource 2 inclusive are displayed. If omitted, only the resource 1 connection is displayed. If the resource is not connected or there are no connection between the specified resources, then only a "C" response is returned.

Return message is formatted as follows:

C,connection type,resource1, resource2/ connection type,resource3, resource4.....

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where the Connection Type and Resources are defined as follows:

Table 16 – Router Connection Configuration Data			
Connection Type	Description	Resource 1	Resource 2
1	Symmetrical Connection, FOT/R to FOM	FOT/R Channel number	FOM Channel number
2	Non-Symmetrical Connection, FOT to FOR Direct	FOT/R Channel number	FOT/R Channel number
3	Non-Symmetrical Connection, FOT/R to FOM	FOT/R Channel number	FOM Channel number
4	Non-Symmetrical Connection, FOM to FOM	FOM Channel number	FOM Channel number

In the response message, all resources are displayed as a 5 digit number, including the leading zero's.

Example 1:

Command: SR,DB,CFT,0,63 will display the resources connected to FOT channel 0 to 63 inclusive.

Response: C,1,0,192/1,1,193/2,2,63/3,6,289

1,0,192 – Symmetrical path, FOT/R channel 0 connected to FOM Channel 192

1,1,193 – Symmetrical path, FOT/R channel 1 connected to FOM Channel 193

2,2,63 – Non-Symmetrical path, FOT/R channel 2 is connected directly to FOT/R 63

3,6,289 – Non-Symmetrical path, FOT/R channel 6 is connected directly to FOM 289

FOT/R channels not shown in the response are not connected.

Note1: command SR,DB,CFR,0,63 would result in the same response.

Note2: since these two commands display the resources connected to FOT/R, any non-symmetrical FOM to FOM connection (connection type 4) will not be displayed.

Example 2:

Command: SR,DB,CFM,192,289 will display the resources connected to FOM channel 192 to 289 inclusive.

Response: C,1,0,192/1,1,193/4,195,288/3,6,289

1,0,192 – Symmetrical path, FOT/R channel 0 connected to FOM Channel 192

1,1,193 – Symmetrical path, FOT/R channel 1 connected to FOM Channel 193

4,195,288 – Non-Symmetrical path, FOM channel 195 is connected directly to FOM 288

3,6,289 – Non-Symmetrical path, FOT/R channel 6 is connected directly to FOM 289

FOM channels not shown in the response are not connected.

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Note3: since this command displays the resources connected to FOM, any non-symmetrical FOT to FOR direct connection (connection type 2) will not be displayed.

3.14 ST (Self-Test)

ST (Self-Test) command will run a pre-defined Self-Test. This will provide the capability to command the execution of portions of the Power-On-Self-Tests on individual boards. Upon completion of Self Test DTSC will send vvvv<CR><LF>*, where vvvv is the status word resulting from the test. Definition of the status word for each board and the interactions required for each test are shown in Table 16. If a test does not complete, the command will timeout and releases the port requesting the test for other functions. In general, running the self-tests will leave the effected boards in their power on initial condition. If "Last Known Configuration" information is valid on the Extender Bridge being used for the test, one of the xxx-LD commands shown in Table 16 can be used to re-establish the configuration for part of all of that PI cage.

Warning – As is potential with all diagnostic mode commands, running sections of the Power-On-Self-Tests can effect the entire system operation. These commands should be used with extreme caution. They should only be used by an individual thoroughly familiar with the total system operation.

Format: ST, fun[,H,hub],mod1,mod2[,mod3]<CR>
Where: hub = HUB number (0-7)
fun = test name
mod1, mod2, mod3 as defined in Table 16

Note: If H,hub is not entered, Client HUB 0 is assumed.

Table 17 – Self Tests				
Fun	Mod 1	Mod 2	Mod 3	Function / Location
HEB	Slot #	OB	-	Run FLASH Checksum, & read F/W version, Power-On test status.
		FOM-S	FOM #	Read FOM # checksum test status, fiber status, & F/W Version # (Slot 1 only)
		FOM-LD	FOM #	Load last known configuration from NVRAM (Slot 1 only)
PIEB	Cage #	OB	-	Run FLASH Checksum, & read F/W version, Power-On test status.
		CR-S	-	Read checksum test status & Firmware Version #
		FOT-S	-	Read checksum test status, fiber status, & F/W Version #
		FOR-S	-	Read checksum test status, fiber status, & F/W Version #
		PI-RL	Port #	Read/Write PI Registers & on card Loopback, 1 card (4 ports of the specified port #).
		CR-L	Channel #	Cage Router Loopback, 1 card (4 ports of the specified channel #)
		CR-LD	Channel #	Load last known configuration from NVRAM (4 ports of the specified channel #)

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Table 17 – Self Tests

Fun	Mod 1	Mod 2	Mod 3	Function / Location
		FOT-LD	-	Load last known configuration from NVRAM
		FOR-LD	-	Load last known configuration from NVRAM

slot# is the physical slot in cage the where the board is installed, range 1-20.

cage# is the ID of a cage, range 0-15 for PI Cage.

FOM# is the identification number of the FOM within a HUB, range 0-15.

Channel # is the identification number of the resource within a cage, range 0-31.

Command Examples:

SMSC sends: ST,H,1,HEB,slot#,OB<CR>

DTSC responses: C,0000,version,HUB EBM slot#,PASSED HUB EXTENDER BRIDGE
SELF-TEST <CR> <LF> *

C,0001,version, HUB EBM slot#,FIBER RECEIVE ERROR DETECTED
<CR> <LF> *

C,0002,version, HUB EBM slot#,FIBER OPTIC DOWN <CR> <LF> *
C,0004,version, HUB EBM slot#,PAGE MAP ERROR AT POWER UP
<CR> <LF> *

C,0008,version, HUB EBM slot#,CAGE ID CHECK ERROR AT
POWER-UP <CR> <LF> *

C,0010,version, HUB EBM slot#,NVRAM READ-WRITE ERROR AT
POWER UP CR> <LF> *

C,0020,version, HUB EBM slot#,FLASH CHECKSUM
ERROR<CR> <LF> *

C,0040,version, HUB EBM slot#,LAST KNOW FIBER STATUS DOWN
<CR> <LF> *

F,ST,HUB EBM slot#,COMMAND TIME OUT

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SMSC sends: ST,PIEB,*cage#*,OB<CR>
DTSC responses: C,0000,*version*,PI CAGE *cage#*,PASSED PORT INTERFACE
EXTENDER BRIDGE SELF-TEST<CR> <LF> *

C,0001,*version*,PI CAGE *cage#*,FIBER RECEIVE ERROR DETECTED
<CR> <LF> *

C,0002,*version*,PI CAGE *cage#*,FIBER OPTIC DOWN <CR> <LF> *

C,0004,*version*,PI CAGE *cage#*,PAGE MAP ERROR AT POWER UP
<CR> <LF> *

C,0008,*version*,CAGE ID CHECK ERROR AT POWER UP
<CR> <LF> *

C,0010,*version*,PI CAGE *cage#*,NVRAM READ-WRITE ERROR AT
POWER UP CR> <LF> *

C,0020,*version*,PI CAGE *cage#*,FLASH CHECKSUM
ERROR<CR> <LF> *

C,0040,*version*,PI CAGE *cage#*,LAST KNOW FIBER STATUS DOWN
<CR> <LF> *

F,ST, PI CAGE *cage#*,COMMAND TIME OUT

SMSC sends: ST,PIEB,*cage#*,CR-S<CR>
DTSC responses: C,0000,*version*, CAGE *cage#*,CAGE ROUTER PASSED FIRMWARE
CHECKSUM TEST<CR> <LF> *

C,0010,*version*,CAGE *cage#*,CAGE ROUTER FAILED FIRMWARE
CHECKSUM TEST <CR> <LF> *

F,ST,xx,CAGE *cage#*,CAGE ROUTER I2C BUS FAILED<CR> <LF> *

F,ST,xx,CAGE *cage#*,CAGE ROUTER NOT INSTALLED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,PIEB,*cage#*,*router*-S<CR>
Where *router* = FOT or FOR
DTSC responses: C,0000,*version*,*ssss*,CAGE *cage #*,*router* ROUTER PASSED
FIRMWARE CHECKSUM TEST <CR> <LF> *

Where *ssss* = HEX status word, one bit for each Fiber Optic Cable
and Receiver, (1 = light detected, 0 = no light detected), LSB is
channel 0 for FOT or channel 16 for FOR.

C,0010, *version*,CAGE *cage #*,*router* ROUTER FAILED FIRMWARE
CHECKSUM TEST <CR> <LF> *

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F,ST,xx,CAGE *cage#*,router ROUTER I2C BUS FAILED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,HEB, *slot#*,FOM-S,FOM#<CR>

DTSC responses: C,0000, *version,ssssssss*,FOM FOM#,FOM ROUTER PASSED
FIRMWARE CHECKSUM TEST <CR> <LF> *

Where *ssssssss* = HEX status word of Fiber Optic Cable and Receiver, one bit for each Fiber Optic Cable and Receiver, (1 = light detected, 0 = no light detected), LSB is channel 0.

C,0010, *version*, FOM FOM#,FOM ROUTER FAILED FIRMWARE
CHECKSUM TEST <CR> <LF> *

F,ST,xx,FOM FOM#,FOM ROUTER I2C BUS FAILED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,PIEB, *cage#*,PI-RL, *port#*<CR>

DTSC responses: C, 00ff, *port#*,PASSED PORT INTERFACE REGISTER
TEST<CR> <LF> *

C,00xy, *port#*, *FAILED* PORT INTERFACE REGISTER
TEST<CR> <LF> *

Where y = HEX status of on-board loopback test, one bit for each of the 4 ports on the same PIB as the specified port#, (1 = PASSED, 0 = FAILED, or not tested)

x = HEX status of packet path test, one bit for each of the 4 ports on the same PIB as the specified port#, (1 = PASSED, 0 = FAILED, or not tested)

Note: port is not tested if it is in-use.

F,ST, *port#*,PORT INTERFACE BOARD NOT
INSTALLED<CR> <LF> *

SMSC sends: ST,PIEB, *cage#*,CR-L, *channel#*<CR>

DTSC responses: C, 000f, *channel#*,CAGE *cage#*,PASSED CAGE ROUTER LOOPBACK
TEST <CR> <LF> *

C,000x, *channel#*,CAGE *cage#*, *FAILED* CAGE ROUTER LOOPBACK
TEST<CR> <LF> *

Where x = HEX status word, one bit for each of the 4 paths of the specified port , (1 = PASSED, 0 = FAILED or not tested)

Note: Cage Router Channel is not tested if it is in-use.

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F,ST,xx,CAGE cage#,CAGE ROUTER I2C BUS FAILED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,PIEB,cage#,CR-LD,channel#<CR>

DTSC responses: C,000x, channel#,CAGE cage#,CAGE ROUTER CONFIGURATION
LOADED<CR> <LF> *

Where x = HEX status, one bit per channel, each bit represents the result of loading the last known configuration for each of the 4 channels of the specified channel (1 = configured successfully, 0 = failed to configure).

F,ST,xx,CAGE cage#,CAGE ROUTER I2C BUS FAILED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,PIEB,cage#,router-LD<CR>

Where router = FOT or FOR

DTSC responses: C,xxxxxxxx,CAGE cage#,router ROUTER CONFIGURATION
LOADED<CR> <LF> *

Where xxxxxxxx = HEX status word, one bit per channel LSB is channel 0. Each bit represents the result of loading the last known configuration of a channel, (1 = configured successfully, 0 = failed to configure).

F,ST,xx,CAGE cage#,router ROUTER I2C BUS FAILED<CR> <LF> *

Where : xx is the I2C failure status

SMSC sends: ST,HEB,slot#,FOM-LD,FOM#<CR>

DTSC responses: C,xxxxxxxx,FOM FOM#,FOM ROUTER CONFIGURATION
LOADED<CR> <LF> *

Where xxxxxxxx = HEX status word, one bit per channel LSB is channel 0. Each bit represents the result of loading the last known configuration of a channel, (1 = configured successfully, 0 = failed to configure).

F,ST,xx,FOM FOM#,FOM ROUTER I2C BUS FAILED<CR> <LF> *

3.15 SW (System function Write)

The System function Write provides the ability to write the various system functions identified in Table 17.

Warning – As is potential with all diagnostic mode commands, changing the configuration file can effect the entire system operation. These values affect operating parameters that determine when alarms are issued, and as such could

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cause potential damage to the equipment due to an undetected fault. They should only be used by individuals thoroughly familiar with the details of the system. As such, this command is only available if the “#” prompt is present indicating that the Diagnostic Mode was entered with the password.

Notes:

1. The function PWR writes to the AC power controller in the specified rack, which turns ON/OFF the specified outlet. The AC power controller outlet assignments are shown in Appendix A.
2. The value for all of the sub-functions within the CFG function are written to the Config.txt file only. When written to the Config.txt file, the entire parameter record is written as follows:
 - a. the current value is used for the unspecified parameter,
 - b. the specified value is used for the specified parameter.
3. The new values are in effect only after restart of the HUB software (i.e., Terminate the software, then perform a WARM start. The Value/Status shown in the table are for example only. Refer to IW function for Maximum/Minimum values of environmental parameters.
4. All of the DB sub-functions are written directly to the database.

Format:	SW,fun,[H,hub],[mod1],[mod2],[mod3],vvvv <CR>
Where:	fun = function to be operated on
	H,hub = HUB number (0-7)
	mod1 = rack #, cage #, or sub-function as shown in Table 17
	mod2 = sub address, etc.
	mod3 = sub function
	vvvv = value or condition
DTSC Response	C,fun,mod1,[mod2],[mod3],old value,new value<CR> <LF> #

Note: If H,hub is not entered, Client HUB 0 is assumed.
The DB function writes only the Status field, bits 11-0

Command Example:	Change password from “simple” to “complex”
SMSC sends:	SW,CFG,PAS,simple,complex<CR>
DTSC Response	W,CONFIRM NEW PASSWORD<CR> <LF> #
SMSC sends;	complex<CR>
DTS Response	C,CFG,PAS,*****,*****<CR> <LF> #

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Table 18 – System Functions, Write

Fun	Mod 1	Mod 2	Mod 3	Value	Function / Location
PWR	Rack #	Outlet #	-	ON / OFF	AC Power on/off in each rack
CFG	PAS		Old pass	New pass	10 Char. Password to enable IW, RW, & SW
	DBN	-			Not available as a Write Function.
	ENT	Port #	a	IP Address	Ethernet port address for logical "Port #"
			e	Command. Echo	Command Echo for Ethernet "Port #" 1 = echo, 2 = no echo
			t	Response Terminator	Response Terminator for Ethernet "Port #" 1 = <CR>, 2 = <CR><LF>
	ETO	Port #	-	Timeout	Time out for Ethernet "Port #"
	PDD	-	-	Delay	Power off Delay from rack or cage alarm
	VALM	-	-	RATE	Voltage alarm message repeat rate in seconds
	POST	-	-	Full/Part	Enable Full Power On Self Test
	CPP	Port #	d,	Device	RS232 Comport assigned device
			b,	Baud rate	120,300,600,1200,2400,4800,7200,9600,19200,38400,57600
			c,	Data bits	7 or 8
			p,	Parity	1 = odd, 2 = even, 3 = none
			s,	Stop bits	1, 2, 3 = none
			e,	Cmd. Echo	Device = SMSC only 1 = echo, 2 = no echo
			t,	Response Terminator	Device = SMSC only: 1 = <CR>, 2 = <CR><LF>
	+ 5H	Cage #	-	5.25V	VCC High Limit, nominal value shown
	+ 5L	Cage #	-	4.75V	VCC Low Limit, nominal value shown
	+ 5Y	Cage #	-	0.05V	VCC Hysteresis, nominal value shown
	+ 12H	Cage #	-	12.5V	+ 12V High Limit, nominal value shown
	+ 12L	Cage #	-	11.5V	+ 12V High Low, nominal value shown
	+ 12Y	Cage #	-	0.05V	+ 12V Hysteresis, nominal value shown
	-12H	Cage #	-	12.5V	-12V High Limit, nominal value shown
	-12L	Cage #	-	11.5V	-12V Low Limit, nominal value shown
	-12Y	Cage #	-	0.05V	-12V Hysteresis, nominal value shown
	LPSH	Cage #	-	3.25V**	Left DC Power Supply DC OK High Limit
	LPSL	Cage #	-	2.75V**	Left DC Power Supply DC OK Low Limit
	LPSY	Cage #	-	0.05V	Left DC Power Supply DC OK Hysteresis
	RPSH	Cage #	-	3.25V**	Right DC Power Supply DC OK High Limit
	RPSL	Cage #	-	2.75V**	Right DC Power Supply DC OK Low Limit
	RPSY	Cage #	-	0.05V	Right DC Power Supply DC OK Hysteresis
	CTN	Cage #	-	50 °C	Cage Temperature alarm ON default
	CTY	Cage #	-	5 °C	Cage Temperature alarm Hysteresis

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Table 18 – System Functions, Write

Fun	Mod 1	Mod 2	Mod 3	Value	Function / Location
	RTN	Rack #	-	50 °C	Rack Temperature alarm ON default
	RTY	Rack #	-	5 °C	Rack Temperature alarm Hysteresis
	LHFH	Cage #	-	200 Cnts	Cage Fan Module, Left Half Fail Limit
	LHFY	Cage #	-	10 Cnts	Cage Fan Module, Left Half Fail Hysteresis
	RHFH	Cage #	-	200 Cnts	Cage Fan Module, Right Half Fail Limit
	RHFY	Cage #	-	10 Cnts	Cage Fan Module, Right Half Fail Hysteresis
	FOMFH	Cage #	-	200 Cnts	FOM Fan Module, Fail Limit
	FOMFY	Cage #	-	10 Cnts	FOM Fan Module, Fail Hysteresis
DB	PORT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				PIC	121, On card links failed
				CRT	122, Cage Router links failed
				FOT	124, FOT/FOR Router links failed
				PKT	128, Packet mode failed
				ALL	12F, All modes failed
				DIFF	140, Discrepancy detected at Power-on
	CRT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				LBK	121, Channel failed power-on loopback
				CFG	140, Failed to configure at Power-on
	FOT	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	FOM	Chan #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	FOR	Chan #	-	AVAIL	000, Available for use

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 18 – System Functions, Write

Fun	Mod 1	Mod 2	Mod 3	Value	Function / Location
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Channel failed
				FBS	121, Fiber Transceiver light detect failed
				CFG	140, Failed to configure at Power-on
	HUB	HUB #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Client HUB failed
				DIFF	140, Discrepancy detected at Power-on
	HXB	HUB EBM #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, HUB EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected
				SUM	124, FLASH Checksum Error
				DIFF	140, Discrepancy detected at Power-on
	CXB	Cage HUB #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Cage EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected
				SUM	124, FLASH Checksum Error
				DIFF	140, Discrepancy detected at Power-on
	IXB	Inter-HUB EBM #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
				HS	110, Out of Service, Hot Swap
				FAIL	120, Inter-HUB EBM Processor failed
				PAGE	121, Page Map Error
				FBS	122, Fiber Optic Down Detected
				SUM	124, FLASH Checksum Error
				DIFF	140, Discrepancy detected at Power-on
	CRP	Cage Router #	-	AVAIL	000, Available for use
				NI	100, Out of Service, Not installed

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 18 – System Functions, Write

Fun	Mod 1	Mod 2	Mod 3	Value	Function / Location
				HS	110, Out of Service, Hot Swap
				TOUT	121, Cage Router Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-on
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
	FTP	FOT Router #	-	HS	110, Out of Service, Hot Swap
				TOUT	121, FOT Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-on
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
	FRP	FOR Router #	-	HS	110, Out of Service, Hot Swap
				TOUT	121, FOR Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-on
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
	FMP	FOM Router #	-	HS	110, Out of Service, Hot Swap
				TOUT	121, FOM Processor Timeout
				CMD	122, Command Failed
				EPSUM	124, EPROM Checksum Error
				CMSUM	128, Command message checksum error
				DIFF	140, Discrepancy detected at Power-On
				AVAIL	000, Available for use
				NI	100, Out of Service, Not installed
	AST	Astarte #		FAIL	120, Failed communication or Power on self test
				DIFF	140, Discrepancy detected at Power-On
VIF	HUB	SCR	Slot #	32 bit data	HUB EBM Status/Command Register
		VBR	Slot #	32 bit data	HUB EBM VME Memory Base Register
		BID	Slot #	32 bit data	HUB EBM VME Receive Broadcast ID Register

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 18 – System Functions, Write

Fun	Mod 1	Mod 2	Mod 3	Value	Function / Location
	PI	PSR	Slot #	32 bit data	VME Primary Slave Register for Broadcast
		SCR	Cage #	32 bit data	Cage EBM Status/Command Register
		VBR	Cage #	32 bit data	Cage EBM VME Memory Base Register
		BID	Cage #	32 bit data	Cage EBM VME Receive Broadcast ID Register
FBSYN	port1	port2			Force the Fiber Synchronization for Fiber link between port1 and port2.
XLAT	HUB	Slot #	Page #	32-bit ADD	Translation Tables in HUB Extender Bridge
	PI	Cage #	Page #	32-bit ADD	Translation Tables in PI Extender Bridge
ROUTER	Cage#	Router Type	Selection	Upper/Lower selection	<p>Selects the “upper” or “lower” half of the specified router type, where the router types are:</p> <p>g: Cage router x: FOT router r: FOR router t: both FOT and FOR router a: all 3 routers</p> <p>The selection are:</p> <p>0: Selects upper half 1: Selects lower half</p>
BGND	State			ON/OFF	<p>Turns Background Testing On or OFF.</p> <p>0: Turn OFF Background Testing 1: Turn ON Background Testing.</p>
DEBUG	State			Debug message level	<p>Sets the level of debug messages printed on the HUB console:</p> <p>0 - no debug message 1- minimum debug messages 2- full debug messages</p> <p>Setting debug message level does not affect the error log file.</p>

** see notes in the “Configuration File” section for details of the limits specific to the HUB Cage power supply monitoring.

3.16 SY (SYstem Shutdown)

The System Shutdown command is used to systematically terminate the Server and Client HUB Software and the respective Operating Systems, then power-off all Cages. The shutdown will not power-off any cooling equipment in the Cage/Rack so that adequate cooling is maintained.

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System shutdown can only be activated from a SMSC Terminal in the **write enabled** Diagnostic Mode. This function is not supported in the Local Maintenance Terminal or the Server HUB keyboard.

The command is executed in two steps:

1. Enter command to initiate the shutdown

Command:	sy,shutdown
DTSC Response	C,SYSTEM SHUTDOWN REQUESTED, TYPE : SY,SHUTDOWN,YES TO SHUTDOWN OR ANY OTHER COMMAND TO ABORT <CR> #

From this point on:

- If Error Message port is turned on, send message **"W,PENDING SHUTDOWN REQUESTED BY DEVICE *nnn*"** to the Error Message port.
- The warning message: **"PENDING SHUTDOWN REQUESTED BY DEVICE *nnn*"** is appended to all response messages on all other active SMSC. Where *nnn* is the SMSC Terminal ID.

The shutdown is aborted when any other command immediately following the shutdown command is entered on the SMSC Terminal that initiated the shutdown. After shutdown abort, the warning message **"SHUTDOWN ABORTED"** is appended to all response message for 30 seconds.

2. Enter command to confirm and execute the shutdown.

This must follow immediately after the shutdown command. The shutdown process will take a few seconds. Prior to actual shutdown, all pending commands from other SMSC Terminal will be allowed to complete with the message **"SHUTDOWN INITIATED BY DEVICE *nnn*"** appended to response message.

Command:	sy,shutdown,yes
DTSC Response:	if all cages powered-off successfully, C,SHUTDOWN COMPLETED, EXITING TO OPERATING SYSTEM<CR># or if unable to powered-off successfully or confirm power-off, W,SHUTDOWN COMPLETED, SOME PI CAGES OR HUB CONTROLLERS NOT POWERED OFF, EXITING TO OPERATING SYSTEM<CR>#

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3.17 Local Maintenance Terminal

Some commands not available, these are identified in the tables for the operational and diagnostic mode commands. When using the menu to input commands, all range commands are restricted to a range of one. However, user entry can use range commands normally. Due to the screen limitations, messages longer than 4 lines on the screen will be scrolled one line at a time using the up arrow.

When using a Local Maintenance Terminal, at least one SMSC port must be in Diagnostic Mode. This enables the Sign on function of the terminal. Once the sign on function is completed, operation is the same as for an SMSC port except where noted elsewhere in this document. At the end of any session, a Local Maintenance Terminal should be signed off to release any resources used.

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4. Configuration File (Config.txt)

A configurable parameter file, "Config.txt" is used to define the value of some parameters which may be site dependent. Each of these parameters also has a default value in the application code if there is not an entry in the Config.txt file. The table below lists the functions that can be controlled by the configuration file along with the default values, and a description of what each function does. For a list of the range of each parameter, see Table 15 - System Functions, Read. When using the System function Write command to change configuration items, only the values in the Config.txt file are changed, but the new values do not take effect until the HUB software is restarted (typically, start the HUB software with a /w option).

Table 19 ~ Configuration File Parameters

Function	Default	Description
Database name	Null	Name of database to be loaded on start of application
Ethernet port 1	193.0.0.4 1204,165000,1,2	IP address, Heart beat timeout, echo, terminator
Ethernet port 2	193.0.0.4 1205,165000,1,2	IP address, Heart beat timeout, echo, terminator
Ethernet port 3	193.0.0.5 1204,165000,1,2	IP address, Heart beat timeout, echo, terminator
Ethernet port 4	193.0.0.5 1205,165000,1,2	IP address, Heart beat timeout, echo, terminator
RS232 port 1	19200,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
RS232 port 2	19200,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
RS232 port 3	19200,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
RS232 port 4	19200,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
RS232 port 5	9600,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
RS232 port 6	9600,8,3,1,1,2	Baud rate, bits per character, parity, stop bits, echo, terminator
HUB CONTROL NAME	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of server HUB
HUB0 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB0
HUB1 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB1
HUB2 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB2

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Table 19 – Configuration File Parameters

Function	Default	Description
HUB3 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB3
HUB4 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB4
HUB5 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB5
HUB6 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB6
HUB 7 Host Name	The Computer Name and IP address defined in the WindowsNT "Network Neighborhood"	Specifies the name and IP address of client HUB7
Mouse	0	Mouse port assignment (0 = none)
AC Control	6	AC Power controller port assignment
astarte port	2,9600,8,3,1	Defines RS232 port number, baud rate, data bits, parity, stop for Astarte control port in the client HUB.
Password	Null	Password to enable IW, RW, & SW commands in Diagnostic Mode
Power Shutdown	60	Number of seconds before power off after a rack or cage alarm
Alarm Rate	300	Number of seconds to repeat alarm message for voltage alarm
Full Selftest	1	Control the extent of Power On Self Test, 0-minimum, 1-full
+ 5H	5.25V	VCC High Limit for specified cage, Max 5.5, Min 5.0
+ 5L	4.75V	VCC Low Limit for specified cage, Max 5.0, Min 4.5
+ 5Y	0.08V	VCC hysteresis for specified cage, Max 0.13, Min 0
+ 12H	12.5V	+ 12V High Limit for specified cage, Max 13.0, Min 12.0
+ 12L	11.5V	+ 12V Low Limit for specified cage, Max 12.0, Min 11.0
+ 12Y	0.19V	+ 12V hysteresis for specified cage, Max 0.32, Min 0
-12H	12.5V	-12V High Limit for specified cage, Max 13.0, Min 12.0
-12L	11.5V	-12V Low Limit for specified cage, Max 12.0, Min 11.0
-12Y	0.19V	-12V hysteresis for specified cage, Max 0.32, Min 0
LPSH	3.25V	Left Hand Power Supply DC OK High Limit for specified cage, except in HUB Cage (see Note 3 below). Max 3.5, Min 3.0
LPSL	2.75V	Left Hand Power Supply DC OK Low Limit for specified cage, except in HUB Cage (see Note 3 below). Max 3.0, Min 2.5

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Table 19 – Configuration File Parameters

Function	Default	Description
LPSY	0.05V	Left Hand Power Supply DC OK hysteresis for specified cage, including HUB Cage. Max 0.08, Min 0
RPSH	3.25V	Right Hand Power Supply DC OK High Limit for specified cage, except in HUB Cage (see Note 3 below). Max 3.5, Min 3.0
RPSL	2.75V	Right Hand Power Supply DC OK Low Limit for specified cage, except in HUB Cage (see Note 3 below). Max 3.0, Min 2.5
RPSY	0.05V	Right Hand Power Supply DC OK hysteresis for specified cage, including HUB Cage. Max 0.08, Min 0
CTN	50°C	Cage Temperature Alarm ON for specified Cage, Max 70.0°C, Min 0°C.
CTY	5°C	Cage Temperature Alarm hysteresis for specified Cage, Max 10.0°C, Min 0°C.
RTN	50°C	Rack Temperature Alarm ON for specified rack, Max 70.0°C, Min 0°C.
RTY	5°C	Rack Temperature Alarm hysteresis for specified rack, Max 10.0°C, Min 0°C.
LHFH	200 Cnts	Left Hand Fan Module Fail for specified Cage, Max 255, Min 0.
LHFY	10 Cnts	Left Hand Fan Module Fail Hysteresis for specified Cage, Max 20, Min 0.
RHFH	200 Cnts	Right Hand Fan Module Fail for specified Cage, Maximum 255.
RHFY	10 Cnts	Right Hand Fan Module Fail Hysteresis for specified Cage, Max 20, Min 0.
FOMFH	200 Cnts	FOM Cage Fan Module Fail for specified Cage, Maximum 255.
FOMFY	10 Cnts	FOM Cage Fan Module Fail Hysteresis for specified Cage, Max 20, Min 0.

Note 1:

The cage environmental variable limits are specified in the following format :

CageN = +5H, +5L, +5Y, +12H, +12L, +12Y, -12H, -12L, -12Y, LPSH, LPSL, LPSY, RPSH, RPSL, RPSY, CTN, CTY, LHFH, LHFY, RHFH, RHFY, FOMFH, FOMFY]

Where : N is the Cage Number within a HUB (0-16)

: FOMFH, FOMFY is only applicable to cage 16, the HUB Cage

Note 2:

The rack temperature limits are specified in the following format :

RackN = RTN, RTY

Where : N is the rack number (0-8)

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Note 3 :

The default value for HUB Rack LPSH, LPSL and RPSH, RPSL should be set to 3.8V and 3.4V respectively. This is different from the Power Supply high, low limits in all other cages since HUB cage System Monitor LPS and RPS inputs are combination of PS1 and PS2 in a load sharing arrangement, the measurements are different from all other LPS's and RPS's. A reading of 3.8V or higher indicates problem with the System Monitor, reading of 3.4V or lower indicates one of the two Power supply malfunction or potential System Monitor problems (refer to document : System Monitor/Extender Bridge Interface Design Specification).

Refer to the IW command for the default, maximum and minimum values.

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5. Ethernet Ports

5.1 SMSC Communication

The DTSC has four logical Ethernet ports, two each on two Ethernet cards. Each of the ports can be used for communication between SMSC and DTSC. Only the Ethernet Ports in HUB 0 will be used for communicating with the SMSC. The default addresses for ports 1 through 4 are 193.0.0.4, 1204; 193.0.0.4, 1205; 193.0.0.5, 1204; and 193.0.0.5, 1205. These may be changed by specifying them in the Config.txt file. These two Ethernet cards are connected to the Thicknet backbone via AUI ports.

After DTSC completes the power-on tests (initial power-on or after hot swap), the DTSC will listen for a TCP/IP connect command on all ports. Once the port is connected, the DTSC will process commands received on the port. If more than one port is connected, the DTSC will process commands from each port.

The format of commands and DTSC responses over the network ports are the same as those described in sections 1 and 2. The GM (Get Message) command will be used as well as the heartbeat of a port in addition to sending unsolicited error messages to the network. The heartbeat is monitored by a Heartbeat Timer, with a configurable time. The DTSC will restart the Heartbeat Timer with the configured time whenever any SMSC command is received. If the Heartbeat Timer times out before DTSC receives any SMSC command, the connection is dropped and DTSC starts to listen for a new connection. The SMSC should issue at least one command within each timeout period, specified in the configuration file, to prevent the connection from being dropped. The GM command should be used during any idle times.

The following commands are not supported in the Ethernet Communications:

1. EM - Set RS232 Communication port as Error Message Port and Control-Z to reset the error message port.
2. SC - Set RS232 Communication Port Parameters
3. RS (or Control-Z) - Reset RS232 Communication Port Parameters to default values.

5.2 Inter-HUB Communication

The DTS server HUB communicates with the client HUBs via the Thicknet Backbone. The IP address assignment are as described in the "Config.txt" file section.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

6. Background Testing

In general, an error message is generated and logged in the error message file when the monitored parameter changes state from "normal" to "alarm", or when a component being tested "failed" the test. No message is generated when state changes from "alarm" to "normal". All error message logged in the log file will be time tagged.

In each message, the variables i, j, k and m are defined as follows:

"i" denotes the HUB number, 0-7.

"j" denotes the HUB EBM number as well as the associated Port interface Cage number 0-15.

"k" denotes the Port Interface Rack number 0-7.

"m" denotes the FOM number 0-15.

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
Power Supply Problems			
1.	Port Interface Cage left hand Power Supply "DC OK" out of limits	HUB i, PI CAGE j, LEFT HAND POWER SUPPLY FAILED	Nominal : 3.00V±0.2V Alarm : LPS < 2.0V
2.	Port Interface Cage right hand Power Supply "DC OK" out of limits	HUB i, PI CAGE j, RIGHT HAND POWER SUPPLY FAILED	Nominal : 3.00V±0.2V Alarm : RPS < 2.0V
3.	Port Interface Cage left hand Power Supply "DC OK" out of limits	HUB i, PI CAGE j, SYSTEM MONITOR PROBLEM, "DC OK" FOR LEFT HAND POWER SUPPLY OUT OF RANGE	Nominal : 3.00V±0.2V Alarm : LPS > LPSH OR 2.0V < LPS < LPSL
4.	Port Interface Cage right hand Power Supply "DC OK" out of limits	HUB i, PI CAGE j, SYSTEM MONITOR PROBLEM, "DC OK" FOR RIGHT HAND POWER SUPPLY OUT OF RANGE	Nominal : 3.00V±0.2V Alarm : RPS > RPSH OR 2.0V < RPS < RPSL
5.	HUB and FOM Cage left hand Power Supply "DC OK" out of limits	HUB i, HUB RACK, PS1/PS2, LEFT HAND POWER SUPPLIES FAILED	Nominal : 3.50V Alarm : LPS < 2.0V
6.	HUB and FOM Cage right hand Power Supply "DC OK" out of limits	HUB i, HUB RACK, PS1/PS2, RIGHT HAND POWER SUPPLIES FAILED	Nominal : 3.50V Alarm : RPS < 2.0V
7.	HUB and FOM Cage left hand Power Supply "DC OK" out of limits	HUB i, HUB RACK PS1, LEFT HAND POWER SUPPLY FAILED	Nominal : 3.50V Alarm : 2.3V < LPS < 2.7V
8.	HUB and FOM Cage right hand Power Supply "DC OK" out of limits	HUB i, HUB RACK PS1, RIGHT HAND POWER SUPPLY FAILED	Nominal value 3.50V Alarm : 2.3V < RPS < 2.7V
9.	HUB and FOM Cage left hand Power Supply "DC OK" out of limits	HUB i, HUB RACK PS2, LEFT HAND POWER SUPPLY FAILED	Nominal : 3.50V Alarm : 2.8V < LPS < 3.2V

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
10.	HUB and FOM Cage right hand Power Supply "DC OK" out of limits	HUB i, HUB RACK PS2, RIGHT HAND POWER SUPPLY FAILED	Nominal : 3.50 V Alarm : 2.8V < RPS < 3.2V
11.	HUB and FOM Cage left hand Power Supply "DC OK" out of limits	HUB i, HUB RACK, SYSTEM MONITOR PROBLEM, "DC OK" FOR PS1/PS2 LEFT HAND POWER SUPPLIES OUT OF RANGE	Nominal value 3.50 V Alarm : LPS > 3.8 OR 3.2V < LPS < 3.4V OR 2.0V < LPS < 2.3V
12.	HUB and FOM Cage right hand Power Supply "DC OK" out of limits	HUB i, HUB RACK, SYSTEM MONITOR PROBLEM, "DC OK" FOR PS1/PS2RIGHT HAND POWER SUPPLIES OUT OF RANGE	Nominal : 3.50 V Alarm : RPS > 3.8 OR 3.2V < RPS < 3.4V OR 2.0V < RPS < 2.3V
13.	Voltage(s) on Slot 1 Extender Bridge out of limits.	HUB i, CAGE j, xxx VOLT SUPPLY OUT OF ADJUSTMENT, ACTUAL = yyy V xxx is the voltage in error: +5, +12, -12	Nominal: 5.00V, or 12.00V Alarm : +5V > +5H or +5V < +5L Alarm : +12V > +12H +12V < +12L Alarm : -12V > -12H -12V < -12L
Air Flow and Cooling Module Problems			
14.	PI Cage Cooling Module Status, left (or right), below limit.	HUB i, PI CAGE j, LEFT (or RIGHT) AIRFLOW BELOW LIMIT, xxx SECONDS TO POWER OFF	Nominal : 153 Counts Alarm : LHF > 200 Counts Alarm : RHF > 200 Counts Record the PI Cage Failed and start the shutdown timer for PI Cage j.
15.	PI Cage Cooling Module Status, left (or right), out of limit.	HUB i, PI CAGE j, SYSTEM MONITOR AIR FLOW MONITORING PROBLEM, LEFT (or RIGHT)	Nominal : 153 Counts Alarm : LHF < 100 Counts Alarm : RHF < 100 Counts Record the PI Cage Failed and start the shutdown timer for PI Cage j.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
16.	HUB Rack, FOM Cage Cooling Module Status: air flow below limit.	HUB i, HUB RACK, FOM CAGE FAN AIRFLOW BELOW LIMIT, xxx SECONDS TO POWER-OFF	Nominal : 153 Counts Alarm : FOMF > 200 Counts Note : higher counts indicates lower air flow. Record the HUB Rack failed and start the shutdown timer for System
17.	HUB Cage Cooling Module Status: air flow out of limit	HUB i, HUB RACK, SYSTEM MONITOR AIR FLOW MONITORING PROBLEM, FOM CAGE FAN	Nominal : 153 Counts Alarm : FOMF < 100 Counts Record the HUB Rack failed and start the shutdown timer for System.
18.	HUB Cage Temperature reading over limit	HUB i, HUB CAGE TEMPERATURE HI ACTUAL = yyy°C, xxx SECONDS TO SYSTEM POWER-OFF	Nominal : 20°C to 30°C Alarm : CTM > CTN Record the HUB Cage failed and start the shutdown timer for HUB i.
19.	HUB Rack Temperature over limit	HUB i, HUB RACK TEMPERATURE HI ACTUAL = yyy°C, xxx SECONDS TO SYSTEM POWER-OFF	Nominal : 20°C to 30°C Alarm : RTM > RTN Record the HUB Rack failed and start the shutdown timer for HUB i.
20.	PI Cage Temperature reading over limit	HUB i, CAGE j, TEMPERATURE HI ACTUAL = yyy°C, xxx SECONDS TO POWER OFF	Nominal : 20°C to 30°C Alarm : CTM > CTN Record the PI Cage failed and start the shutdown timer for cage j.
21.	PI Rack Temperature reading over limit	HUB i, RACK k, TEMPERATURE HI ACTUAL = yyy°C, xxx SECONDS TO POWER OFF	Nominal : 20°C to 30°C Alarm : RTM > RTN Record the PI Rack failed and start the shutdown timer for rack k.
Internal Communication			
22.	HUB Cage, Slot 1 EBM Status, unexpected status for Environmental Parameter read/write	HUB i, HUB CAGE, ENV PARM yyy (LPS), op (READ) FAILED, STATUS sss (NOT INSTALLED), xxx SECONDS TO POWER OFF	Record the HUB Cage failed and start the shutdown timer for HUB Cage. Refer to note below for definition of: yyy, op and sss.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
23.	PI Cage EBM Status, unexpected status for Environmental Parameter read/write	HUB i, PI CAGE, ENV PARM yyy (LPS), <i>op</i> (READ) FAILED, STATUS sss (NOT INSTALLED), xxx SECONDS TO POWER OFF	Record the PI Cage Failed and start the shutdown timer for cage j. Refer to note below for definition of: yyy, <i>op</i> and sss.
24.	Cage Router Status, unexpected status for Cage Router read/write	HUB i, PI CAGE j, CAGE ROUTER, <i>op</i> (WRITE) FAILED, STATUS sss	Update the status of processing resource in database. Refer to note below for definition of: <i>op</i> and sss.
25.	FOT Router Status, unexpected status for FOT Router read/write	HUB i, PI CAGE j, FOT ROUTER, <i>op</i> (WRITE) FAILED, STATUS sss	Update the status of processing resource in database. Refer to note below for definition of: <i>op</i> and sss.
26.	FOR Router Status, unexpected status for FOR Router read/write	HUB i, PI CAGE j, FOR ROUTER, <i>op</i> (WRITE) FAILED, STATUS sss	Update the status of processing resource in database. Refer to note below for definition of: <i>op</i> and sss.
27.	FOM Router Status, unexpected status for FOM Router read/write	HUB i, HUB CAGE, FOM j, <i>op</i> (WRITE) FAILED, STATUS sss	Update the status of processing resource in database. Refer to note below for definition of: <i>op</i> and sss.
28.	Server HUB to Client HUB The Server HUB detected a Socket problem or Data Corruption.	HUB i, SERVER TO CLIENT COMMUNICATION PROBLEM, xxx SECOND TO POWER OFF	Reports the failure to the error log file and starts the shutdown timer for Client HUB i.
29.	Server HUB to Client HUB The Server HUB does not receive any response from the destination Client HUB i within the time-out period.	HUB i, SERVER TO CLIENT COMMUNICATION ERROR, RESPONSE TIME OUT, xxx SECOND TO POWER OFF	Server HUB reports the failure to the error log file and starts the shutdown timer for Client HUB i.
30.	HUB EBM 0 to System Monitor Client HUB i does not receive any response from the System Monitor within the time-out period.	HUB i, HUB CAGE, ENV PARM yyy (LPS), <i>op</i> (READ) RESPONSE TIME OUT, xxx SECONDS TO POWER OFF	Client HUB i detects the failure and report back to the Server HUB for logging error message. Refer to note below for definition of: yyy, <i>op</i>

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
31.	Cage EBM System Monitor Client HUB i does not receive any response from the Cage EBM for Environmental operations within the time-out period.	HUB i, PI CAGE j, ENV PARM yyy (LPS), op (READ) RESPONSE TIME OUT, xxx SECONDS TO POWER OFF	Client HUB i detects the failure and report back to the Server HUB for database update and logging error message.
32.	Cage EBM/Cage Router Client HUB does not receive any response from the Cage Router within the time-out period.	HUB i, CAGE j, CAGE ROUTER COMMUNICATION ERROR – RESPONSE TIME OUT	Client HUB i detects the failure and report back to the Server HUB for database update and logging error message.
33.	Cage EBM/FOT Router Client HUB does not receive any response from the FOT Router within the time-out period.	HUB i, CAGE j, FOT ROUTER COMMUNICATION ERROR – RESPONSE TIME OUT	Client HUB i detects the failure and report back to the Server HUB for database update and logging error message.
34.	Cage EBM/FOR Router Client HUB does not receive any response from the FOR Router within the time-out period.	HUB i, CAGE j, FOR ROUTER COMMUNICATION ERROR – RESPONSE TIME OUT	Client HUB i detects the failure HUB report back to the Server HUB for database update and logging error message.
35.	HUB EBM/FOM Router Client HUB does not receive any response from the destination FOM j within the time-out period.	HUB i, FOM j, COMMUNICATION ERROR – RESPONSE TIME OUT	Client HUB i detects the failure and report back to the Server HUB for database update and logging error message.
Definition of: yyy, op and sss yyy: Environmental Parameter + 5V, + 12V, -12V, LPS, RPS, LHF, RHF, CTM, RTM, FOMF, SMI op: Operation Performed READ, WRITE sss: Status Returned NOT INSTALLED, FAILED, DEVICE BUSY, I/O OPERATION ABORTED, PROGRAM ERROR, INVALID PARAMETER			
DTS Configuration Database and Field Discrepancies			

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
36.	<p>Duplicated Resource Usage</p> <p>The database shows that an output of the resource is assigned to multiple input.</p>	<p>DATABASE ERROR, DUPLICATED CONNECTION IN aaaa, xxxx,yyyy CONTENT zzzz</p> <p>where aaaa is one of the following which identifies the column (field) in the database where the duplication is detected:</p> <p>LINKED PORT - linked_port CAGE ROUTER - input_CRT FOT ROUTER - output_FOT FOR ROUTER - output_FOR FOM - output_FOM</p> <p>xxxx and yyyy are the row number in the database where the duplication is found and zzzz is the content</p>	
37.	<p>Invalid Resource ID</p> <p>Detected an invalid ID in a database entry that contains resource number. The valid values for resource ID are:</p> <p>0-4095 for NTDS ports 4096-4671 for Direct Fiber (Astarte ports) -1 for out of service</p>	<p>DATABASE ERROR, INVALID RESOURCE ID, xxxx, yyyy, zzzz</p> <p>where xxxx is the row number, yyyy is the column number and zzzz is the actual content</p>	
38.	<p>port_type Discrepancy</p> <p>The port type maintained in the database is different from the port type maintained locally in the PI Cage</p>	<p>DATABASE AND FIELD DISCREPANCY – PORT NNNNN TYPE MISMATCH, DB = tttt, FIELD = uuuu</p> <p>where NNNNN is the port number and tttt, uuuu are the type from the respective sources</p>	
39.	<p>Resource Assignment Discrepancy</p> <p>The input to output assignment maintained in the database is different from the crossbar switch setting maintained locally in the cage.</p>	<p>DATABASE AND FIELD DISCREPANCY – RESOURCE aaaa, xxxx, DB = tttt, FIELD = uuuu</p> <p>where aaaa is the resource type, xxxx is the output of the resource, tttt and uuuu are the input assigned to the output obtained from the respective sources.</p> <p>aaaa is one of :input_crt, output_fot, output_for, output_FOM</p>	

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
40.	type_pic Discrepancy The Port Interface Board type maintained in the database is different from the actual installed in the cage.	DATABASE AND FILED DISCREPANCY - PIB nnnnn, DB = tttt, FIELD = uuuu where nnnnn is the PIB number, tttt and uuuu are the PIB type, serial or parallel, as obtained from the respective sources.	
41.	input_pic Discrepancy The state of the PIB output multiplexer maintained in the database is different from the actual setting in the PIB registers	DATABASE AND FIELD DISCREPANCY - PIB nnnn, DB = tttt, FIELD = uuuu where : nnnn is the PIB number, tttt and uuuu are the settings obtained from the respective sources.	
42.	Resource Usage Inconsistency The port usage of linked ports maintained in the database are different, the discrepancy may be in: status, device number, device type, mode i.e., port x linked to port y and the status of port usage indicated port x is a member of broadcast link while port y is link as pairs.	DATABASE INCONSISTENCY – resource NNNNN USAGE = aaaa , resource MMMMM USAGE = bbbbbb where resource is : PORT, CRT, FOT, FOR, FOM NNNNN, MMMMM the resource ID, corresponding to the row number in the database. aaaa and bbbb are the contents of the usage_port field.	
43.	Inter HUB Connection Discrepancy. The inter HUB connection maintained in the database is in error. i.e., database indicates inter HUB EBM in HUB i is not connected to inter HUB in HUB j.	DATABASE ERROR, INVALID CONNECTION IN HUB i TO HUB j.	
Switching Resource Test			
44.	Path Failed A linked pair of ports failed to correctly transfer data. AND No suitable resources are available to identify the specific resource failure.	PORT NNNNN AND MMMMM, PATH FAILED where nnnnn and mmmmm are the ports linked, PATH is the resources used in linking the to ports. The format and information contained in the PATH are the same as the Display Path (DH) command response message as described in the IDS.	The Server HUB updates the affected fields of the DTS database, to reflect the resource failure.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
Rack Shutdown			
45.	HUB i, HUB cage temperature OR HUB rack temperature high alarm in effect AND shutdown timer > preset period	HUB i, HUB CAGE TEMPERATURE HI, POWERING OFF HUB i AND ALL ITS PI RACKS. OR HUB i, HUB CAGE TEMPERATURE HI, POWERING OFF HUB i AND ALL ITS PI RACKS.	The Server HUB sends command to the AC controllers of all PI racks within this HUB to power- off all PI Racks. Server HUB sends command to its own AC controller to power-off HUB cage and FOM cage.
46.	HUB i, PI Rack temperature high alarm in effect AND shutdown timer > preset period	HUB i, PI RACK j, TEMPERATURE HI, POWERING OFF PI RACK.	The Server HUB sends command to the AC controller of affected PI rack to power-off the PI Rack.
47.	HUB i, PI Cage temperature high alarm in effect AND shutdown timer > preset period	HUB i, PI CAGE j, TEMPERATURE HI, POWERING OFF PI CAGE j.	The Server HUB sends command to the AC controller of affected PI cage to power-off the PI cage.
48.	HUB i, PI Cage airflow low alarm in effect AND shutdown timer > preset period	HUB i, PI CAGE j, LEFT (or RIGHT) AIRFLOW LOW, POWERING OFF PI CAGE j.	The Server HUB sends command to the AC controller of affected PI cage to power-off the PI cage.
49.	HUB i, PI Cage System Monitor fan speed monitoring problem in effect AND shutdown timer > preset period	HUB i, PI CAGE j, SYSTEM MONITOR AIRFLOW MONITORING PROBLEM, POWERING OFF PI CAGE j.	The Server HUB sends command to the AC controller of affected PI cage to power-off the PI cage.
50.	HUB i, Rack FOM Fan airflow low alarm in effect AND shutdown timer > preset period	HUB i, HUB RACK, FOM CAGE, AIRFLOW LOW, POWERING OFF HUB i AND ALL ITS PI RACKS.	The Server HUB sends command to the AC controller of all PI racks within this HUB to power- off all PI Racks. Send command to own AC controller to power-off HUB cage and FOM cages.
51.	HUB i, Rack System monitor fan speed monitoring problem in effect and AND shutdown timer > preset period	HUB i, HUB RACK, SYSTEM MONITOR, AIRFLOW MONITORING PROBLEM, POWERING OFF HUB i AND ALL ITS PI RACKS.	The Server HUB sends command to AC controllers of all PI racks within this HUB to power-off all PI Racks. The Server HUB sends command to own AC controller to power-off HUB cage and FOM cages.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 20 – Background Testing Messages

#	Condition	Error Message	Other Actions and Notes
52.	Two or more DC power supplies failed in a HUB i, HUB Rack AND shutdown timer > preset period	HUB i, HUB RACK, PS1 LEFT (or RIGHT) AND PS2 LEFT (or RIGHT) POWER SUPPLY FAILED, POWERING OFF HUB i AND ALL ITS PI RACKS or HUB i, HUB RACK, PS1/PS2 LEFT (or RIGHT) POWER SUPPLY FAILED, POWERING OFF HUB i AND ALL ITS PI RACKS	The Server HUB sends command to AC controllers of all PI racks within this HUB to power-off all PI Racks. The Server HUB sends command to own AC controller to power-off HUB cage and FOM cages.
53.	Client HUB i to HUB Cage Slot 1 EBM communication failed AND shutdown timer > preset period	HUB i, HUB CAGE COMMUNICATION PROBLEM, POWERING OFF HUB i AND ALL ITS PI RACKS	The Server HUB sends command to AC controllers of all PI racks within this HUB to power-off all PI Racks. The Server HUB sends command to own AC controller to power-off HUB cage and FOM cages.
54.	Client HUB i to PI Cage j EBM communication failed AND shutdown timer > preset period	HUB i, COMMUNICATION PROBLE, POWERING OFF CAGE j.	The Server HUB sends command to the AC controller of affected PI cage to power-off the PI cage.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

7. Astarte Fiber Optic Switch

One Astarte Fiber Optic Switch can be connected to each HUB. Each Astarte Fiber Optic Switch can have up to 72 ports (8 ports per module, up to 9 modules). Port type is "DF" Direct Fiber, and the port numbers are defined as follows :

HUB 0 : 4096 – 4167
HUB 1 : 4168 – 4239
HUB 2 : 4240 – 4311
HUB 3 : 4312 – 4383
HUB 4 : 4384 – 4455
HUB 5 : 4456 – 4527
HUB 6 : 4528 – 4599
HUB 7 : 4600 – 4671

The following commands are not supported for Astarte Fiber Optic Switch ports :

LM – Link Many
LS – Link Special
VF – Verify Path Off
VN – Verify Path On
VP – Verify Path
LD – Link Diagnostic

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

8. HUB Software Start-Up

HUB software start-up options are provided to accommodate various start-up conditions as described below. The options are entered as the MS-DOS command line option in the form of:

/option1, option2, option3,.....

where: options are some combinations of characters, numbers separated by ","
if an option is omitted, then a default value is assumed.

8.1 Server HUB Start-UP

8.1.1 Server-HUB Software Start-Up Modes

Three HUB software start-up modes are provided to initialize the DTS to a known state. The options provided are : Default Start-up, Warm Start and Cold Start. In the absence of the Start-Up Mode option, a **default** start-up mode is used.

A. **Default Start-Up**

The Default Start-up starts up the HUB software and initializes the DTS to the **last configured and operating state**. The default start-up mode is used when:

1. In the operating system DOS window, user manually starts up the HUB software by typing the command line **without any option**.

In this option, the Power-On Tests are performed to ensure all components function correctly, and the DTS operating configuration is re-loaded from the Non-Volatile RAM (NVRAM).

B. **Warm Start :**

The Warm Start starts up the HUB software while the DTS remains **"powered-on and operating"**, and **without disturbing the operation**. The HUB software is started from the operating system DOS window, user manually starts the HUB software by typing the command line with a **"/w"** option.

In this option, Power-On Tests are not performed and the operating configuration remain unchanged. This option is typically used in :

1. Manual Shutdown of HUB software only (for whatever reason), while the HUB Cage, PI Cages and the FOMs remain powered up, operating and undisturbed.

C. **Cold Start :**

The Cold Start starts up the HUB software and initializes the DTS to a **new configuration**. The HUB software is started from the operating system DOS window, user manually starts the HUB software by typing the command line **with a "/c" option**.

In this option:

1. A new configuration database is automatically loaded from the original configuration (i.e., no links present in the database) generated by the DTS Configurator.
2. The Cage Router, FOT, FOR and FOM configuration are restored to the loopback configuration.
3. The PI Board register configuration NVRAM is restored to a known default values based on the configuration defined in the database.
4. All the other startup functions are the same as in the normal startup.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

This option is typically used to re-configure the DTS with new topology and configuration.

8.1.2 Debug Message Level

The debug message level option specifies the degree of debug message to be printed on the HUB console. The debug message levels are defined as follows:

Table 21 – Debug Message Level Definition		
Command Line Entry	Message Level	Description
none	0	No debug message.
d,0	0	No debug message.
d,1	1	Only the processor to processor communication messages and any error message that is written to the log file.
d,2	2	All debug and error messages.

8.1.3 AC Controller Power-On

This option, when specified with a "p" option in the command line instructs the HUB software to perform complete entire DTS system power on by turning on each rack/cage using the AC controller. If omitted, HUB software will not turn-on each rack/cage using the AC controller.

8.1.4 Turn-on Background Test

This option, when specified with a "b" option in the command line instructs the HUB software to start the Background Testing at the completion of Power-On. If omitted, the Background Testing is not started.

8.2 DTS Start-Up Examples

The following examples illustrates different ways of starting up the DTS using some combination of command line options.

Table 22 – DTS Start Up Examples		
No.	Command Line and option	Power-On Actions
1.	server_hub_r8.00	No AC power-on, load the last save configuration, perform power-on self tests, disable background tests, no debug messages.
2.	server_hub_r8.00 /b	No AC power-on, load the last save configuration, perform power-on self tests, enable background tests, no debug messages.
3.	server_hub_r8.00 /p,b	Power-on the entire DTS system with AC power-on, load the last save configuration, perform power-on self tests, enable background tests, no debug messages.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Table 22 – DTS Start Up Examples

No.	Command Line and option	Power-On Actions
4.	server_hub_r8.00 /p,b,d,0	Power-on the entire DTS system with AC power-on, load the last save configuration, perform power-on self tests, enable background tests, set debug messages to level 1.
5.	server_hub_r8.00 /c	No AC power-on, load the original configuration, perform power-on self tests, disable background tests, no debug messages.
6.	server_hub_r8.00 /c,b	No AC power-on, load the original configuration, perform power-on self tests, enable background tests, no debug messages.
7.	server_hub_r8.00 /c,p,b	Power-on the entire DTS system with AC power-on, load the original configuration, perform power-on self tests, enable background tests, no debug messages.
8.	server_hub_r8.00 /c,p,b,d,2	Power-on the entire DTS system with AC power-on, load the original configuration, perform power-on self tests, enable background tests, set debug messages to level 2.
9.	server_hub_r8.00 /w	No AC power-on, load the last save configuration, skip power-on self tests, disable background tests, no debug messages.
10.	server_hub_r8.00 /w,b	No AC power-on, load the last save configuration, skip power-on self tests, enable background tests, no debug messages.

8.3 Client HUB Start-Up

Normally, the Client HUB software is automatically started when the Client HUB re-boot is completely.

In the event that the Client HUB software is terminated from a SMSC terminal as described in section 9, the Client HUB software may be restarted by the following procedure:

1. On a SMSC terminal (or PC connected to the DTS network), invoke Telnet.
2. In Telnet, connect the client HUB as follows:
 - Host Name: enter the IP address of the Client HUB
 - Port: enter 2000
 - Term Type: enter vt100
3. Once connected, type: client_hub_rnmm.exe, where *nmm* is the current software version (i.e. client_hub_r8.00.exe)
4. Once the Client HUB is running, the following Diagnostic Mode command must be entered from a SMSC terminal in order to enable any access.
 - sw,db,hub,n,0 where *n* is the client HUB number

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

9. HUB Software Shutdown

The HUB Software (Server and Clients) may be terminated from a SMSC terminal connected to the Server HUB as follows:

On the SMSC terminal, type “#” followed by HUB number(s), followed by the RETURN key. The HUB numbers are entered without delimiters, where 0 to 7 are designated as Client HUB number 0 to 7 inclusive and 8 is designated as the Server HUB. If no HUB number is provided, then the Server HUB and ALL Client HUBs are terminated.

Example:

#035 <ENTER> terminates Client HUB 0,3 and 5. All other Client HUBs and the Server HUB remain in operation.

#8 <ENTER> terminates the Server HUB only, All Client HUBs remain in operation.

When a Client HUB is terminated from SMSC terminal as described above, the Server HUB records the Client HUB as in the “Hot Swap State” so that no command can access the terminated HUB. In addition, the Client HUB enters a “remote start state”, where by the Client HUB waits for an Ethernet connection on the logical port 2000 of the IP address. The procedure described in 8.2 may be used to start the Client HUB.

To completely power-off the entire system, use the system shutdown command described in section 3.16, system shutdown command.

SMSC / HUB INTERFACE DESIGN SPECIFICATIONS

Appendix A – AC Power Controller Outlet Assignment

The table below defines the AC Power Controller Outlet Assignment in Both the PI Rack and HUB Rack.

Table 23 – AC Controller Outlet Assignment		
Outlet	HUB Rack	PI Rack
1	Rack Fan – Top	Rack Fan – Top
2	FOM Fan Tray – Top	Even Cage Fan – Top
3	HUB Rack DC Power Supply – Top	Even Cage DC Power Supply – Top
4	FOM Cage Fan – Bottom	Odd Cage Fan – Bottom
5	HUB Rack DC Power Supply – Bottom	Odd Cage DC Power Supply – Bottom
6	HUB Fan Tray	Not used

Figure below shows the HUB Rack layout and relationship between the equipment in the rack and AC Power Controller outlet assigned to power the equipment.

Rack Fan	
HUB Cage	
HUB Cage Fan Tray	
FOM Cage	
FOM Cage Fan Tray	
FOM Cage	
FOM Cage Fan (Blower)	
Left DC Power Supply	Right DC Power Supply
Left DC Power Supply	Right DC Power Supply
AC Controller	

DTS Testing Requirements

Production

1. Scope

The test requirements specified in this document are applicable to the following DTS deliverable items.

1. Port Interface (PI) Racks (See Table 2).
2. HUB Racks (See Table 2).
3. Software/Firmware releases (See Table 3).
4. Server Computer and Client Computer (See Table 3).
5. Installation and Checkout (See Table 4).

Tests 1 to 4 inclusive shall be performed at CCT facility in Anaheim, California. Test 5 is shall be performed at the installation site.

Table 5 provides a list of the detailed test procedures in each test.

2. Test Records

The test record shall include:

1. Signed and dated copy of the completed test procedure.
2. A listing of the DTS configuration under test. Only one copy of the DTS configuration listing is required if the same configuration is used for more than one test procedure.
3. Where applicable:
 - a. The test script, its include files and Test Log.
 - b. Annotated copy of the test procedure
4. Any other document as specified in the test procedure.

The test result documentation shall clearly identify:

1. Date and Time of the test.
2. Software/Firmware version used.
3. DTS Configuration tested.
4. Where applicable, the serial number of the highest assembly level of the item being tested.

3. Test Configuration

The DTS configuration under test will vary depending on the test performed. Table 1 provides the guidelines for configuring the DTS for Production Testing.

Note: A DTS test configuration is specified in each existing test procedure identified in this document. These configurations are examples only and will be replaced by the actual configuration at the time of testing. The name of the configuration and configuration listing should be included in test records as specified in section 2 of this document.

DTS Testing Requirements

Production

Table 1 – Test Configuration Guidelines

Test Type	Configuration Guidelines
Port Interface Rack	<ol style="list-style-type: none"> 1. Single PI Rack configured per customer order. 2. A HUB Rack to support the PI Rack under test.
HUB Rack	<ol style="list-style-type: none"> 1. One HUB, including all required HUB EBM's and FOM's 2. Two PI Cages in one PI Racks. 3. Minimum of two Parallel and two Serial Port Interface boards per PI Cage. 4. Cage Router, FOT and FOR in each PI Cage. <p>Note: The requirements for physical fiber optic cable connections between the FOT, FOM and FOR are determined in each individual test.</p>
Software/Firmware Release Server Computer Client Computer	<p>Alternate Path Test:</p> <ol style="list-style-type: none"> 1. One HUB, including all required HUB EBM's and FOM's 2. 4 PI Cages in 2 PI Racks 3. Minimum of 2 Parallel and 2 Serial Port Interface boards per PI Cage. 4. Cage Router, FOT and FOR <p>Note: The requirements for physical fiber optic cable connections between the FOT, FOM and FOR are determined in each individual test.</p> <p>All Other Tests:</p> <ol style="list-style-type: none"> 1. Two HUBs, including all required FOM's 2. One PI Rack per HUB 3. Two PI Cages in each PI Rack 4. Minimum of 2 Parallel and 2 Serial Port Interface boards per PI Cage 5. Cage Router, FOT and FOR in each PI Cage <p>Note: The requirements for physical fiber optic cable connections between the FOT, FOM and FOR are determined in each individual test.</p>
Installation and Checkout	As installed at site.

DTS Testing Requirements Production

Table 2 - Production Unit Testing – Port Interface and HUB Racks	
Test Name	Test Objectives Overview
The following tests are applicable to all Port Interface Racks	
AT-XFER-ALL	Verify the proper data transfer of DTS Production Racks with Multiple sets of links such that all like ports are linked and all linked channels simultaneously passing data.
AT-STARTUP	Verify the operation of DTS perform the start up functions within 5 minutes
AT-TEMP	Verifys the operation of DTS's to protect the system against over temperature situations in Port Interface Cage and Rack, HUB Cage and Rack.
AT-LMT	Verify the operation of DTS Local Maintenance Terminal (LMT) connected to HUB To Cage EBM, Cage to HUB EBM, and Inter HUB EBM for maintenance activities.
TT-DIAG	Verify the operation of DTS Diagnostic Mode commands to identify faulty paths in On-Board, Cage Router and Fiber path links.
The following tests are applicable to all HUB Racks	
AT-CIF-RS232	Verify the operation of DTS to successfully execute all Control Interface commands via the RS232 Communication Ports. This test excludes commands related to operating the Astarte Fiber Switch.
AT-CIF-ETHERNET	Verify the operation of DTS to successfully execute all Control Interface commands via the Ethernet Communication Ports. This test excludes commands related to operating the Astarte Fiber Switch.
AT-STARTUP	Verify the operation of DTS perform the start up functions within 5 minutes
AT-TEMP	Verifys the operation of DTS's to protect the system against over temperature situations in Port Interface Cage and Rack, HUB Cage and Rack.
AT-LMT	Verify the operation of DTS Local Maintenance Terminal (LMT) connected to HUB To Cage EBM, Cage to HUB EBM, and Inter HUB EBM for maintenance activities.

DTS Testing Requirements Production

Table 3– Software/Firmware Release, Server Computer, Client Computer Testing	
Test Name	Test Objectives Overview
AT-CIF-RS232	Verify the ability of DTS to successfully execute all Control Interface commands via the RS232 Communication Ports. This test excludes commands related to operating the Astarte Fiber Switch.
AT-CIF-ETHERNET	Verify the ability of DTS to successfully execute all Control Interface commands via the Ethernet Communication Ports. This test excludes commands related to operating the Astarte Fiber Switch.
AT-CIF-TIMING	Verify that, under the normal operation condition, the average time for operating the DTS to link ports in each path type is within the specification. The command to operate the DTS is originated from the SMSC via ether RS232 or Ethernet Communication channel, but not both.
AT-SER	Verify the basic operations of all RS232 and Ethernet communication ports for DTS Server HUB communication.
TT-BGTEST	Verify the Power Up and Background Testing Capability of the DTS EDM to detect, report and power-off failed equipment as required.
TT-ALTPH	Verify the ability of the DTS to reconfigure paths utilizing system redundancy in establishing port connections when the equipment is not available.
TT-BCAST	Verify the operation of the DTS Broadcast Mode for NTDS type A and B ports.
TT-FOCOM	Verify the operation of the EDM DTS to maintain its set configuration and data transfer as expected for an indefinite period of time after loss of the inter-cabinet (rack) communication.
TT-HTSWAP	Verify the operation of DTS for live circuit card replacement (hot swap) of Lowest Replaceable Units (LRU)'s, with minimum disturbance to the DTS operation.
AT-STARTUP	Verify the operation of DTS perform the start up functions within 5 minutes.
AT-TEMP	Verifys the operation of DTS's to protect the system against over temperature situations in Port Interface Cage and Rack, HUB Cage and Rack.

DTS Testing Requirements

Production

Table 4 – Installation and Checkout Testing	
Test Name	Test Objectives Overview
AT-STARTUP	Verify the operation of DTS perform the start up functions within 5 minutes
AT-TEMP	Verifys the operation of DTS's to protect the system against over temperature situations in Port Interface Cage and Rack, HUB Cage and Rack.
TT-DIAG	Verify the operation of DTS Diagnostic Mode commands to identify faulty paths in On-Board, Cage Router and Fiber path links.

DTS Testing Requirements

Production

Table 5 – Detailed Test Procedure List

Test Name	Applicability	Detailed Test Procedures
AT-CIF-ETHERNET	HUB Rack Software/Firmware Release Server Computer Client Computer	AT-CIF-ENET-SYNTAX AT-CIF- ENET -DT AT-CIF- ENET -DP AT-CIF- ENET -DF AT-CIF- ENET -DL AT-CIF- ENET -BP AT-CIF- ENET -BR AT-CIF- ENET -VP AT-CIF- ENET -VN AT-CIF- ENET -VF AT-CIF- ENET -OUTRANGE AT-CIF- ENET -MISMATCH AT-CIF- ENET -LINKALL AT-CIF- ENET -LM AT-CIF- ENET -LS. AT-CIF- ENET -DH AT-CIF- ENET -EM AT-CIF- ENET -GM AT-CIF- ENET -PF AT-CIF- ENET -PNPF AT-CIF- ENET -HE AT-CIF- ENET -SC AT-CIF- ENET -RS AT-CIF- ENET -DMALL AT-CIF- ENET -OM AT-CIF- ENET -ST

DTS Testing Requirements

Production

Table 5 – Detailed Test Procedure List

Test Name	Applicability	Detailed Test Procedures
AT-CIF-RS232	HUB Rack Software/Firmware Release Server Computer Client Computer	AT-CIF-RS232-SYNTAX AT-CIF-RS232-DT AT-CIF-RS232-DP AT-CIF-RS232-DF AT-CIF-RS232-DL AT-CIF-RS232-BP AT-CIF-RS232-BR AT-CIF-RS232-VP AT-CIF-RS232-VN AT-CIF-RS232-VF AT-CIF-RS232-OUTRANGE AT-CIF-RS232-MISMATCH AT-CIF-RS232-LINKALL AT-CIF-RS232-LM AT-CIF-RS232-LS. AT-CIF-RS232-DH AT-CIF-RS232-EM AT-CIF-RS232-GM AT-CIF-RS232-PF AT-CIF-RS232-PNPF AT-CIF-RS232-HE AT-CIF-RS232-SC AT-CIF-RS232-RS AT-CIF-RS232-DMALL AT-CIF-RS232-OM AT-CIF-RS232-ST
AT-CIF-TIMING	Software/Firmware Release Server Computer Client Computer	AT-CIF-TIMING
AT-LMT	PI Rack HUB Rack	AT-LMT
AT-SER	Software/Firmware Release Server Computer Client Computer	AT-SERVER

DTS Testing Requirements

Production

Table 5 – Detailed Test Procedure List

Test Name	Applicability	Detailed Test Procedures
AT-STARTUP	PI Rack HUB Rack Software/Firmware Release Server Computer Client Computer Installation and Checkout	AT-STARTUP
AT-TEMP	PI Rack HUB Rack Software/Firmware Release Server Computer Client Computer Installation and Checkout	AT-TEMP-CAGE AT-TEMP-RACK
AT-XFER-ALL	PI Rack	AT-XFER-ALL
TT-ALTPH	Software/Firmware Release Server Computer Client Computer	AT-ALTPH-CROS-1H64 AT-ALTPH-FOTOS-1H64 AT-ALTPH-FOROS-1H64 AT-ALTPH-FOMOS-1H64 AT-ALTPH-NOCR-1H64 AT-ALTPH-NOFOT-1H64 AT-ALTPH- NOFOR -1H64 AT-ALTPH- NOFOM -1H64
TT-BCAST	Software/Firmware Release Server Computer Client Computer	TT-BCAST-LINK TT-BCAST-MOD

DTS Testing Requirements

Production

Table 5 – Detailed Test Procedure List

Test Name	Applicability	Detailed Test Procedures
TT-BGTEST	Software/Firmware Release Server Computer Client Computer	AT-BGTEST
TT-DIAG	PI Rack Installation and Checkout	TT-DIAG-PIB TT-DIAG-CR TT-DIAG-FOTMR
TT-FOCOM	Software/Firmware Release Server Computer Client Computer	TT-FCOM-RS232 TT-FCOM-ENET TT-FCOM-SR2CL TT-FCOM-HXB2PIC
TT-HTSWAP	Software/Firmware Release Server Computer Client Computer	TT-HTSWAP-PIB TT-HTSWAP-CR TT-HTSWAP-FOT TT-HTSWAP-FOR TT-HTSWAP-FOM TT-HTSWAP-CHEXT TT-HTSWAP-HCEXT TT-HTSWAP-PI-CAGE

DTS Testing Requirements Components

1. Scope

The test requirements specified in this document are applicable to the following DTS deliverable items.


1. Unpopulated Port Interface (PI) Racks
2. Unpopulated Hub Racks
3. Individual Components/Lowest Replaceable Units (LRUs)
4. Repaired Individual Components/Lowest Replaceable Units (LRUs)

Tests shall be performed at CCT facility in Anaheim, California during the production or repair process.

2. Test Records

The test record/documentation for Unpopulated PI Racks and Unpopulated Hub Racks shall be executed Assembly Travelers (enclosure (1)). When DTS systems are integrated, the Government approved system level Factory Acceptance Test (see DTS System Testing Requirements) shall be executed.

All Individual Components/LRUs shall be fully tested to meet the DTS approved drawings and plans (provided under contract N00178-96-C-2001, as updated). By delivering the items to the Government, the contractor certifies the items are fully functional when inserted into an existing DTS system. Contract specific documentation is not required for Individual Components/LRUs or Repaired Individual Components/LRUs.

 AEGIS SITE SWITCHING DATA TRANSFER SYSTEM	CONTRACT NO. N00178- DOCUMENT RELEASE DATE _____
HUB CONTROLLER EQUIPMENT ENCLOSURE ASSY TRAVELER	
DESCRIPTION OF CONFIGURED ITEM _____	ASSY NO. _____ <div style="float: right; text-align: right;"> REV LEVEL: _____ SERIAL NO. _____ </div>

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Port Interface Equipment Enclosure Assy	300400006-101				
- Serialized ID Label , Rear of Cabinet	03-1033-10				
- ID Lable , Upper Channel	300900024-005				
- Logo , Front Door	300900054-001				
- Filters , Front Door	3009-FF5				
- Velcrow, Inside Front Door	10-96055-K45				
- Keys , Inside Front Door					
- Adjust Retma Rails					
- Grommet , Floor Cutout	10-0000-05				
Exhaust Fan Assy					
- Power Cord	03-0115-06				
- Temp Sensor Assy	300700014-101				
	300700004-102				
Patch Panel Frames					
- Ground Straps					
- Blank Filler Panels					
- Logo , Upper Rear Panel					
AC Controller Module, IPC (Pulizzi)	IPC3302-2513				
Power Supply Chassis (HC Power Inc.)	PS2-C1658 (13A0169-000)				
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				
- Power Cord and Jumpers	300700014-105				
Power Supply Chassis (HC Power Inc.)	PS2-C1658 (13A0169-000)				
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				
- Power Cord and Jumpers	300700014-105				
Blower Module (McLean Engineering)	4EB3500CDP4				
- Power Cord	300700014-104				



**AEGIS SITE SWITCHING
DATA TRANSFER SYSTEM**

CONTRACT NO. N00178-

DOCUMENT RELEASE DATE _____

HUB CONTROLLER EQUIPMENT ENCLOSURE ASSY TRAVELER

Sheet 2 of 3

DESCRIPTION OF
CONFIGURED ITEM _____

ASSY NO. _____

REV LEVEL: _____

SERIAL NO. _____

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Fiber Optic Mux Cage Assy	300400005-101				
- Cage Assy ID Label	03-1033-10				
- Board Keys	01-3684-326				
- PWA, Backplane, Fiber Optic Mux	300810012-102				
- DC Power Harness	300700002-103				
- Blank Front Panels	01-3658-194				
Fan Tray					
Fiber Optic Mux Cage Assy	300400005-101				
- Cage Assy ID Label	03-1033-10				
- Board Keys	01-3684-326				
- PWA, Backplane, Fiber Optic Mux	300810012-102				
- DC Power Harness	300700002-104				
- Blank Front Panels	01-3658-194				
Fan Tray	03-30160-FG				
Hub Cage Assy	300400004-101				
- Cage Assy ID Label	03-1033-10				
- Board Keys	01-3684-326				
- PWA, Backplane, Hub Controller	300810013-102				
- DC Power Harness	300700002-102				
- PWA, System Monitor	300810019-103				
- Misc PWR Cable	300700008-101				
- PWR Sense Cable	300700003-101				
- Blower Sense Cable	300700011-101				
- I2C Cable Upper FOM	300700006-101				
- I2C Cable Lower FOM	300700006-102				
- 120mm Extender PWA	300810009-102				
- Blank Front Panels	01-3658-186				
Front Upper Filler Panel	01-0175-01				



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HUB CONTROLLER EQUIPMENT ENCLOSURE ASSY TRAVELLER

Sheet 3 of 3

DESCRIPTION OF CONFIGURED ITEM

ASSY NO.

REV LEVEL:

SERIAL NO.

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Power Supply Bus Bars	300700015-101				
Attach All Hub And FOM Cage Assy Cables					
Attach Power Supply Ground To Retma Rails					
Door Ground Straps					
Caution Labels					
Anchor All PWR Cords To Retma Rails					
Connect All PWR Cords To Controller					
Test And Adjust Power Supply					

NOTES:



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Sheet 1 of 4

SERIAL NO.

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Port Interface Equipment Enclosure Assy	300400006-101				
- Serialized ID Label , Rear of Cabinet	03-1033-10				
- ID Label , Upper Channel	300900024-004				
- Logo , Front Door	300900054-001				
- Filters , Front Door	3009-FF5				
- Velcro, Inside Front Door	10-96055-K45				
- Keys , Inside Front Door					
- Adjust Retma Rails					
- Grommet , Floor Cutout	10-0000-05				
Exhaust Fan Assy					
- Power Cord	03-01115-06				
- Temp Sensor Assy	300700014-101				
	300700004-102				
Connector Panel Frames	300900051-001				
- Ground Straps	300700012-				
- Clamp Bar Assy	300900022-001, 300900023-001				
- Blank Filler Panels	300900052-001, 300900053-001				
- Logo , Upper Rear Panel	300900054-001				
AC Controller Module, IPC (Pulizzi)	IPC3302-2513				
Power Supply Chassis (HC Power Inc.)	PS2-CI658 (13A0169-000)				
- Power Supply Module (HC Power Inc.)	HS1214-CI658 (10A0048-000)				
- Power Supply Module (HC Power Inc.)	HS1214-CI658 (10A0048-000)				
- Power Cord and Jumpers	300700014-105				
Blower Module (McLean Engineering)	4EB3500CDP4				
- Power Cord	300700014-104				



AEGIS SITE SWITCHING DATA TRANSFER SYSTEM

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PORT INTERFACE EQUIPMENT ENCLOSURE ASSY TRAVELER

Sheet 2 of 4

DESCRIPTION OF
CONFIGURED ITEM _____

ASSY NO. _____

REV LEVEL: _____

SERIAL NO. _____

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Port Interface Cage Assy	300400003-101				
- Cage Assy ID Label	03-1033-10				
- Board Keys	01-3684-326				
- PWA, Backplane, Port Interface	300810011-104				
- Back Plane Stiffeners					
- DC Power Harness	300700002-101				
- PWA, System Monitor	300810019-103				
- Misc PWR Cable	300700008-101				
- PWR Sense Cable	300700003-101				
- Blower Sense Cable	300700011-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- Paddle Board Clamp	300900047-001, 300900048-001,-002				
- Connector Panel PWR Cables	300700005-125 thru -132				
- Test Paddle Board Assy's					
- Blank Front Panels	01-3685-194				
Attach All Lower PI Cage Assy Cables					
Attach Power Supply Ground To Retma Rails	300700012-				
Front Center Filler Panel	01-0700-00				
Power Supply Chassis (HC Power Inc.)	PS2-C1658 (13A0169-000)				
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				



AEGIS SITE SWITCHING DATA TRANSFER SYSTEM

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PORT INTERFACE EQUIPMENT ENCLOSURE ASSY TRAVELER

Sheet 3 of 4

DESCRIPTION OF
CONFIGURED ITEM

ASSY NO. _____

REV LEVEL: _____

SERIAL NO. _____

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
- Power Supply Module (HC Power Inc.)	HS1214-C1658 (10A0048-000)				
- Power Cord and Jumpers	300700014-103				
Blower Module (McLean Engineering)	4EB3500CDP4				
- Power Cord	300700014-102				
Port Interface Cage Assy	300400003-101				
- Cage Assy ID Label	03-1033-10				
- Board Keys	10-3684-326				
- PWA, Backplane, Port Interface	300810011-104				
- Back Plane Stiffeners	300900017-001				
- DC Power Harness	300700002-101				
- PWA, System Monitor	300810019-103				
- Misc PWR Cable	300700008-101				
- PWR Sense Cable	300700003-101				
- Blower Sense Cable	300700011-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- PWA, Quad Port Interface Paddle	300810016-101				
- Paddle Board Clamp	300900047-001, 300900048-001, -002				
- Connector Panel PWR Cables	300700005-117 thru -124				
- Test Paddle Board Assy's					
- Blank Front Panels	01-3658-194				
Attach All Upper PI Cage Assy Cables					



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Sheet 4 of 4

SERIAL NO.

COMPONENT DESCRIPTION	PART / MODEL NUMBER	SERIAL NUMBER	REV	LOCATION	INSP
Attach Power Supply Ground To Retma Rails	300700012-				
Front Upper Filler Panel	01-0525-00				
Gore Cables	01-2MMA-2073				
Test Gore Cables					
Door Ground Straps	300700012-				
Caution & Warning Labels	03-1033-10				
Anchor All PWR Cords To Retma Rails					
Connect All PWR Cords To Controller					
Test And Adjust Power Supply					

NOTES:

[illegible]

N00178-03-R-2001

GOVERNMENT FURNISHED PROPERTY

DESCRIPTION	MODEL #	SERIAL NUMBER	QTY	Each	Ext. Price
LIFE CYCLE EQUIPMENT:					
Hub Racks	300400007	HCR001, HCR002	2	1,218.38	2,436.76
Hub Cage	300400004	HCC001, HCC002	2	1,250.75	2,501.50
Hub Controller Backplane	300810012	HCB13003, HCB13001	2	359.93	719.86
Fan Blower	03-3500-00	9712916838, 9712916841, 9712916844, 9712916837, 9712916840, 9712916835, 9712916836, 9712916843, unserialized	9	158.09	1,422.81
AC Power Distribution	9723	00047922, 00048369, 00048370, 00048372, 00048373, 00048374, 00048375, 00048376, 00048377	9	233.22	2,098.98
Power Supply Racks	21898	unserialized	9	256.25	2,306.25
Power Supplies	21897	unserialized	18	437.38	7,872.84
VME Computer Module	MXI-2	A49E21, A49E17, 2 unserialized	4	343.50	1,374.00
Industrial Computer	300400009	L-2751800003, L-2751800002, L-2751800001, L-2741000001	4	1,153.78	4,615.12
Keyboard Rack		961202122, 970102211, 961202017, 1 unserialized	4	28.60	114.40
5 - 3 Row Extender	3008100009	unserialized	4	19.25	77.00
60mm Extender	01-4101-02	unserialized	4	11.68	46.72
TSB Cage	300400005	unserialized	2	924.71	1,849.42
PI Rack	300400006	PIR002, PIR001, PIR003, unserialized	4	1,283.66	5,134.64
PI Cage	300400003	PIC001, PIC002, PIC003, PIC004	4	3,154.97	12,619.88
PI Backplane	300810011	unserialized	1	541.42	541.42
Suitcases w/Power Supply		unserialized	8	737.58	5,900.64
Boards:					
TYPE A/B - Transceiver	DRA08043, DRA08053, DRA08038, DRA08041, DRA08014, DRA08023, DRA08030,	33	657.09	21,683.97	
TYPE D - Transceiver	DRD10035, DRD10036, DRD10020	3	181.08	543.24	
TYPE E - Transceiver	DRS07121, DRE07122, DRE07124, DRE07123, DRE07322, DRE07146, DRE07145,	28	230.11	6,443.08	
Paddle Boards	PIP16044, PIP16042, PIP16045, PIP16041, PIP16002, PIP16046, PIP16043, PIP16021,	32	104.51	3,344.32	
Video Signal (IFF) Transceiver	DRV29003, DRV29004	2	935.00	1,870.00	
* Quad-Parallel Port Interface PWA	300810002	18	9,154.00	164,772.00	
* Quad-Serial Port Interface PWA	300810001	3	9,233.00	27,699.00	
* Cage Router PWA	300810006	1	13,082.00	13,082.00	
* Extender Bridge Module (Cage to	300810005-C2H	3	13,976.00	41,928.00	
* Extender Bridge Module (Hub to	300810005-H2C	3	13,919.00	41,757.00	
* Fiber Optic Transmitter (FOT) PWA	300810017	1	17,535.00	17,535.00	
* Fiber Optic Receiver (FOR) PWA	300810004	1	17,947.00	17,947.00	
* Fiber Optic Multiplexer (FOM) PWA	300810003	1	19,491.00	19,491.00	
* Blower	03-3500-00	1	1,311.00	1,311.00	
* Rack, DC Power Supply	03-1658-01	1	2,492.00	2,492.00	
* Switching DC Power Supply	03-1658-00	2	4,252.00	8,504.00	
* Backplane, Port Interface (PI)	300910011	3	5,266.00	15,798.00	
* Hub Computer Client	300400010	2	17,859.00	35,718.00	
** Quad-Serial Port Interface PWA	300810001	15	11,136.00	167,040.00	
** Cage Router PWA	300810006	2	16,446.00	32,892.00	
** Extender Bridge Module (Hub to	300810005-H2H	2	23,044.00	46,088.00	
** Fiber Optic Transmitter (FOT) PWA	300810017	2	21,567.00	43,134.00	
** Fiber Optic Receiver (FOR) PWA	300810004	2	21,996.00	43,992.00	

N00178-03-R-2001

<u>DESCRIPTION</u>	<u>MODEL #</u>	<u>SERIAL NUMBER</u>	<u>QTY</u>	<u>Each</u>	<u>Ext. Price</u>
LIFE CYCLE TEST STATION, includes:			1	39,749.75	39,749.75
PI CAGE			1		
Backplane		PIB11018	1		
Logic Control Signal Generator -	301810006	SG-06001	1		
Test Board			1		
PI Interplane	301820007		1		
PI Emulator Boards	301810005		8		
FOM CAGE			1		
Backplane		FOM12005	1		
Fan Pack		S6171	1		
HP Oscilloscope	HP 54750A	US40280223	1		
HP Module	HP 54751A	US34371229	1		
LIFE CYCLE TEST FIXTURE, includes:			1	19,874.90	19,874.90
Rack			7	\$20,783.32	\$145,483.24
*** Parallel Test Fixture Boards			3	\$20,787.27	\$62,361.81
*** Serial Test Fixture Boards			7	\$4,975.00	\$34,825.00
*** Parallel Transceiver Boards (Military Connectors)			23	\$2,044.00	\$47,012.00
*** Serial Transceiver Boards					
TF Cage w/Backplane		TFC03001			
HP Logic Analyzer / Oscilloscope	HP 1660CS	US37040141			
PRODUCTION TEST FIXTURE, includes:			1	19,874.90	19,874.90
Rack			7	\$20,783.32	\$145,483.24
*** Parallel Test Fixture Boards			3	\$20,787.27	\$62,361.81
*** Serial Test Fixture Boards			7	\$4,975.00	\$34,825.00
*** Parallel Transceiver Boards (Military Connectors)			50	\$2,044.00	\$102,200.00
*** Serial Transceiver Boards					
TF Cage w/Backplane		unserialized			
HP Logic Analyzer / Oscilloscope	HP 1660CS	US38240131			
Power Harness Station:			1	5,000.00	5,000.00
Cage		unserialized			
Backplane (fried)		PIB11016			
Fan, Blower		9712916842			
Power Supply Rack		21898-7			
Noyes			1	450.00	450.00
Optical Light Meter w/case and	Noyes	OPM4 and OLS1			
Optical Light Source					
TOTAL VALUE:					<u>\$1,593,408.50</u>

* Items ordered under N00178-02-D-2014 / 0002 for the Life Cycle System
Delivery NLT 23 May 2003

** Items ordered under N00178-02-D-2014 / 0007 for the Life Cycle System
Delivery NLT 31 August 2003

*** Items ordered under N00178-02-D-2020 / 0002 for the Life Cycle System
Delivery NLT 14 August 2003

DEPARTMENT OF DEFENSE #011-02
CONTRACT SECURITY CLASSIFICATION SPECIFICATION

(The requirements of the DoD Industrial Security Manual apply to all security aspects of this effort.)

1. CLEARANCE AND SAFEGUARDING

a. FACILITY CLEARANCE REQUIRED

SECRET

b. LEVEL OF SAFEGUARDING REQUIRED

NONE

2. THIS SPECIFICATION IS FOR: (x and complete as applicable)

<input checked="" type="checkbox"/>	a. PRIME CONTRACT NUMBER	
<input type="checkbox"/>	b. SUBCONTRACT NUMBER	
<input type="checkbox"/>	c. SOLICITATION OR OTHER NUMBER	Due Date (YYMMDD)

3. THIS SPECIFICATION IS: (x and complete as applicable)

<input type="checkbox"/>	a. ORIGINAL (Complete date in all cases)	Date (YYMMDD)
<input type="checkbox"/>	b. REVISED (Supersedes all previous specs)	Revision No. Date (YYMMDD)
<input type="checkbox"/>	c. FINAL (Complete item 5 in all cases)	Date (YYMMDD)

4. IS THIS A FOLLOW-ON CONTRACT?

☐ YES

☒ NO

If Yes, complete the following:

Classified material received or generated under

(Preceding Contract Number) is transferred to this follow-on contract.

5. IS THIS A FINAL DD FORM 254?

☐ YES

☒ NO

If Yes, complete the following:

In response to the contractor's request dated

retention of the identified classified material is authorized for the period of

6. CONTRACTOR (Include Commercial and Government Entity (CAGE) Code)

a. NAME, ADDRESS, AND ZIP CODE	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)
CABLE AND COMPUTER TECHNOLOGY, INC. 1555 SINCLAIR STREET ANAHEIM, CA 92806-5934	61373	DEFENSE SECURITY SERVICE DIRECTOR OF INDUSTRIAL SECURITY 1 WORLD TRADE CTR, SUITE 622 LONG BEACH, CA 90831-0622

7. SUBCONTRACTOR

a. NAME, ADDRESS, AND ZIP CODE	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)

8. ACTUAL PERFORMANCE

a. LOCATION	b. CAGE CODE	c. COGNIZANT SECURITY OFFICE (Name, Address, and Zip Code)
THIS DD 254 IS A GUIDE FOR BIDDING PURPOSES ONLY. AN ORIGINAL DD 254 WILL BE ISSUED UPON AWARD OF CONTRACT.		

9. GENERAL IDENTIFICATION OF THIS PROCUREMENT

DATA TRANSFER SYSTEM (DTS) SWITCHING HARDWARE INTEGRATION, INSTALLATION

10. THIS CONTRACT WILL REQUIRE ACCESS TO:			11. IN PERFORMING THIS CONTRACT, THE CONTRACTOR WILL:		
	YES	NO		YES	NO
a. COMMUNICATIONS SECURITY (COMSEC) INFORMATION		<input checked="" type="checkbox"/>	a. HAVE ACCESS TO CLASSIFIED INFORMATION ONLY AT ANOTHER CONTRACTOR'S FACILITY OR A GOVERNMENT ACTIVITY	<input checked="" type="checkbox"/>	
b. RESTRICTED DATA		<input checked="" type="checkbox"/>	b. RECEIVE CLASSIFIED DOCUMENTS ONLY		<input checked="" type="checkbox"/>
c. CRITICAL NUCLEAR WEAPON DESIGN INFORMATION		<input checked="" type="checkbox"/>	c. RECEIVE AND GENERATE CLASSIFIED MATERIAL		<input checked="" type="checkbox"/>
d. FORMERLY RESTRICTED DATA		<input checked="" type="checkbox"/>	d. FABRICATE, MODIFY, OR STORE CLASSIFIED HARDWARE		<input checked="" type="checkbox"/>
e. INTELLIGENCE INFORMATION:		<input checked="" type="checkbox"/>	e. PERFORM SERVICES ONLY		<input checked="" type="checkbox"/>
(1) Sensitive Compartmented Information (SCI)		<input checked="" type="checkbox"/>	f. HAVE ACCESS TO U.S. CLASSIFIED INFORMATION OUTSIDE THE U.S., PUERTO RICO, U.S. POSSESSIONS AND TRUST TERRITORIES		<input checked="" type="checkbox"/>
(2) Non-SCI		<input checked="" type="checkbox"/>	g. BE AUTHORIZED TO USE THE SERVICES OF DEFENSE TECHNICAL INFORMATION CENTER (DTIC) OR OTHER SECONDARY DISTRIBUTION CENTER		<input checked="" type="checkbox"/>
f. SPECIAL ACCESS INFORMATION		<input checked="" type="checkbox"/>	h. REQUIRE A COMSEC ACCOUNT		<input checked="" type="checkbox"/>
g. NATO INFORMATION		<input checked="" type="checkbox"/>	i. HAVE TEMPEST REQUIREMENTS		<input checked="" type="checkbox"/>
h. FOREIGN GOVERNMENT INFORMATION		<input checked="" type="checkbox"/>	j. HAVE OPERATIONS SECURITY (OPSEC) REQUIREMENTS		<input checked="" type="checkbox"/>
i. LIMITED DISSEMINATION INFORMATION		<input checked="" type="checkbox"/>	k. BE AUTHORIZED TO USE THE DEFENSE COURIER SERVICE		<input checked="" type="checkbox"/>
j. FOR OFFICIAL USE ONLY INFORMATION		<input checked="" type="checkbox"/>	l. OTHER (Specify)		
k. OTHER (Specify)					

12. PUBLIC RELEASE. Any information (classified or unclassified) pertaining to this contract shall not be released for public dissemination except as provided by the industrial Security Manual or unless it has been approved for public release by appropriate U.S. Government authority. Proposed public releases shall be submitted for approval prior to release.

☐ Direct ☐ Through (Specify):

N/A

to the Directorate for Freedom of Information and Security Review, Office of the Assistant Secretary of Defense (Public Affairs)* for review.
*In the case of non-DoD User Agencies, requests for disclosure shall be submitted to that agency.

13. SECURITY GUIDANCE. The security classification guidance needed for this classified effort is identified below. If any difficulty is encountered in applying this guidance or if any other contributing factor indicates a need for changes in this guidance, the contractor is authorized and encouraged to provide recommended changes; to challenge the guidance or the classification assigned to any information or material furnished or generated under this contract; and to submit any questions for interpretation of this guidance to the official identified below. Pending final decision, the information involved shall be handled and protected at the highest level of classification assigned or recommended. (Fill in as appropriate for the classified effort. Attach, or forward under separate correspondence, any documents/guides/extracts referenced herein. Add additional pages as needed to provide complete guidance.)

All classified visit requests for the Dahlgren Division, Naval Surface Warfare Center should be forwarded to the Visitor Control Office no later than five (5) working days prior to intended visit.

All classified visit requests for the prime contractor for other activities shall have "NEED-TO-KNOW" certified by the Technical Point of Contact listed below. All requests shall contain the information required by Chapter 6, NISPOM, and shall not exceed the contract expiration date.

ERICK FRANCIS, CODE N82, (540)653-1592
Technical Point of Contact

ESTIMATED EXPIRATION DATE:

14. ADDITIONAL SECURITY REQUIREMENTS. Requirements, in addition to ISM requirements are established for this contract. (If Yes, identify the pertinent contractual clauses in the contract document itself, or provide an appropriate statement which identifies the additional requirements. Provide a copy of the requirements to the cognizant security office. Use Item 13 if additional space is needed.)

☐ Yes ☒ No

15. INSPECTIONS. Elements of this contract are outside the inspection responsibility of the cognizant security office. (If Yes, explain and identify specific areas or elements carved out and the activity responsible for inspections. Use Item 13 if additional space is needed.)

☐ Yes ☒ No

16. CERTIFICATION AND SIGNATURE. Security requirements stated herein are complete and adequate for safeguarding the classified information to be released or generated under this classified effort. All questions shall be referred to the official named below.

a. TYPED NAME OF CERTIFYING OFFICIAL

d. TITLE

c. TELEPHONE (Include Area Code)

GLORIA E. ELMORE

Contracting Officer's Security Representative

(540)653-8723

d. ADDRESS (Include Zip Code)

COMMANDER, DAHLGREN DIVISION
NAVAL SURFACE WARFARE CENTER, CODE XDC94
DAHLGREN, VA 22448-5100

17. REQUIRED DISTRIBUTION

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | a. CONTRACTOR |
| <input type="checkbox"/> | b. SUBCONTRACTOR |
| <input checked="" type="checkbox"/> | c. COGNIZANT SECURITY OFFICE FOR PRIME AND SUBCONTRACTOR |
| <input type="checkbox"/> | d. U.S. ACTIVITY RESPONSIBLE FOR OVERSEAS SECURITY ADMINISTRATION |
| <input checked="" type="checkbox"/> | e. ADMINISTRATIVE CONTRACTING OFFICER |
| <input checked="" type="checkbox"/> | f. OTHERS AS NECESSARY |

e. SIGNATURE

Gloria E. Elmore

ATTACHMENT J.5 - VALUE ENGINEERING GUIDE

Navy Value Engineering Guide for Contractors

1. Introduction.

The Navy has revitalized its Value Engineering (VE) program based on direction from the highest levels within the Department. This renewed VE effort is evident in the annual VE savings goals and training requirements already promulgated throughout the Navy Contracting System. To monitor and enhance the effectiveness of this initiative, the achievement of VE objectives has been incorporated, where appropriate, into Navy personnel performance appraisals. The policy of realizing maximum VE application in Navy contracts is being implemented and carefully reviewed throughout all levels of the Department of the Navy. However, to ensure this program's success, the active support, cooperation, and participation of the contractor community is required. We strongly invite your interest and involvement in the VE program, and believe that the mutual benefits realized thereby will be readily apparent in the following overview of VE methodology and procedures.

2. Definitions, Policy and Procedures.

a. VE is a process of systematically analyzing functional requirements to achieve the essential functions in the most cost effective manner consistent with requisite performance, reliability/maintainability, and safety standards. It shares the same basic objectives and philosophy as other value improvement terms such as Value Analysis, Value Control, Value Management, etc. As a management discipline, VE has been successfully applied across the entire spectrum of the acquisition and support process. Its application is not and should not be limited by the term "engineering" to hardware design and production. VE is a fundamental approach which challenges even basic premises (including the need for the product's existence) in light of viable substitutes. Because of this perspective, VE may be applied to systems, equipment, facilities, procedures, methods, software and supplies. VE's application in these various areas has resulted in more suitable products, cost savings and increased profits to the contractors.

b. Contractors participate in the Navy VE program by two (2) means:

(1) Voluntarily suggest methods for performing more economically and share in any resulting savings. Known as the "incentive" approach.

(2) Comply with contract clauses which require a specific program be established to identify and submit to the Government methods for performing more economically. This requirement is incorporated as a separate priced line item of the contract and must meet minimum requirements of MIL-STD-1771. Known as the "Program Requirement" or "Mandatory" approach.

c. Basic policies for the VE program are set forth in FAR 48.102. Key features include:

(1) Agencies shall provide contractors a substantial financial incentive to develop and submit VECP's.

(2) Agencies shall provide contractors objective and expeditious processing of VECP's.

(3) Agencies shall encourage subcontractors to submit VECP's by requiring the prime to incorporate VE clauses in appropriate subcontracts.

(4) VE incentive payments do not constitute profit or fee within the limitation imposed by 10 U.S.C. 2036(d) and 41 U.S.C. 254(b).

d. VECP's can significantly increase profit. Contractors may share up to 55% of net savings, 50% of royalties and 20% of annual collateral savings when their cost reduction idea are adopted.

e. VE program output can be considerably improved through the formal training of the personnel involved. Such training is available on-site from private VE consultants and varies from straight classroom instruction to actual "hands-on" in-house VE projects guided by the instructor. This type of training may be tailored to the company's needs. The Government has two VE courses available. The "Contractual Aspects of VE" (CAVE), taught by the United States Air Force Institute of Technology School of Systems and Logistics at Wright Patterson Air Force Base; and the "Principles and Applications of VE" (PAVE), taught by the Army Management Engineering Training Activity at Rock Island. Both the CAVE and PAVE courses are open to Government contractor personnel on a space available basis and attendance is encouraged.

3. VE Methodology.

It is unnecessary for contractors to "reinvent the wheel" by making large investments of time/energy/money to develop formal VE analysis techniques. A formal methodology consisting of seven (7) distinct elements has already been developed, tested and proven in extended use over the years. This methodology (as shown in the DOD Manufacturing Management Handbook for Program Managers) may be applied from the component level up to and including entire systems. In specific cases, some elements may be considered "givens" and rigidly following the elements in sequence may not be necessary. These seven (7) elements are :

(1) VE Project Selection - The choice of system, service, hardware, component, requirement, etc., for VE application.

(2) Determination of Function - Analysis and definition of the function of the selected VE project to answer the question. "What does it do?" The function itself may be questioned (i.e., is it necessary?).

(3) Information Gathering - Collection and assembly of all necessary information concerning the VE item selected. Allows the VE personnel to become intimately familiar with the item while answering the questions, "What does it cost?" and "What is this function worth?"

(4) Development of Alternatives - Perhaps the most important element of the seven. Where an alternative is being sought, the use of free imagination, tempered with experience, will develop the best ideas. In initial "brainstorming" sessions, all ideas, even the wildest, should be duly recorded and considered. Don't constrain yourself to a conservative approach at this time. This element will provide an answer to the question, "What else can perform this function?"

(5) Analysis of Alternatives - Through this analysis, it is possible to "weed out" those ideas which appear technically or financially unfeasible. This analysis permits the selection of an alternative(s) for further feasibility testing based on the resulting cost estimates. This element answers the question, "What is the cost of the alternative(s)?"

(6) Feasibility Testing and Function Verification - Determines that the selected alternative(s) can perform the required function and are technically feasible. A variable alternative must provide the essential functional performance and be capable of being implemented. This element provides answers to the questions, "Are the alternatives technically feasible?" and "Does the alternative provide the essential function?"

(7) Preparation and Submission of Proposals - The final section, documentation and formal VECP preparation of the alternative. The VECP must be prepared and submitted in accordance with the requirements of the contract.

Additional detailed guidance in utilizing formal VE methodology may be found in DOD Handbook 5010.8-H "Value Engineering" as well as in courses called out in paragraph 2e above.

4. Sharing Mechanisms.

VE shall be implemented in Navy contracts by clauses identifying either the "incentive" or "mandatory" methods discussed in paragraph 2b above. The following table summarizes possible sharing arrangements under the different methods and by type of contract.

GOVERNMENT/CONTRACTOR SHARES OF NET ACQUISITION SAVINGS (figures in percent)

Sharing Agreement

Incentive (Voluntary)	Program Requirement (Mandatory)			
	Instant contract rate	Concurrent and future rate	Instant contract rate	Concurrent and future rate
Fixed-price (other than incentive)	50/50	50/50	75/25	75/25
Incentive (fixed-price or cost)	*	50/50	*	75/25
Cost-reimbursement (other than incentive)	75/25	75/25	85/15	85/15

*Same sharing arrangements as the contract's profit or fee adjustment formula.

**Includes cost-plus-award-fee contracts.

A contractor may be entitled to share in VE savings in two (2) different ways. The first results from savings on the acquisition of the product. Acquisition savings may accrue on your current contract, on other concurrent contracts where the VECP savings applies and on future contracts which incorporate the VECP. The other type of savings is collateral savings. Collateral savings are those in any other area such as logistics support, operations or other ownership savings which accrue to the Government as a result of accepting a VECP. The contractor is entitled to share in both acquisition savings and collateral savings. The extent of the sharing and types of savings shared are to be negotiated on a case-by-case basis depending on the nature of the VECP and subject to the sharing limits of the above table.